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YORKSHIRE COLLEGE,
VICTORIA UNIVERSITY

THE
EDINBURGH
NEW DISPENSATORY:

CONTAINING,

I. THE ELEMENTS OF PHARMACY.

II. THE MATERIA MEDICA;
OR THE NATURAL, CHEMICAL AND MEDICAL HISTORY, OF THE
SUBSTANCES EMPLOYED IN MEDICINE.

III. THE PHARMACEUTICAL PREPARATIONS AND
COMPOSITIONS;

INCLUDING
RANSLATIONS OF THE LONDON PHARMACOPŒIA OF 1825, OF THE
EDINBURGH PHARMACOPŒIA OF 1817, AND OF THE DUBLIN
PHARMACOPŒIA OF 1807.

WITH AMPLE COMMENTARIES, AND NUMEROUS TABLES.

ELEVENTH EDITION,
MUCH IMPROVED.

BY ANDREW DUNCAN JUN. M. D.
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COPENHAGEN, AND ASSOCIATE OF THE LINNEAN
SOCIETY OF LONDON, AND OF THE FACULTY
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MEDICAL DEPARTMENT,
YORKSHIRE COLLEGE,
VICTORIA UNIVERSITY.

TO

ANDREW DUNCAN, M. D.

PROFESSOR OF THE INSTITUTIONS OF MEDICINE

IN THE

UNIVERSITY OF EDINBURGH,

THIS WORK IS,

FOR THE ELEVENTH TIME,

MOST DUTIFULLY AND AFFECTIONATELY

INSCRIBED

BY

HIS SON.

DEPARTMENT,
YORKSHIRE COLLEGE,
VICTORIA UNIVERSITY.

PREFACE.

Since the commencement of the present century, this work has been the constant object of my study; and when I review the great progress which pharmacological knowledge has made in this country during that period, I feel gratified in thinking, that it has been, in some degree, owing to the information which the Edinburgh New Dispensatory has been the means of disseminating through all classes of the profession.

Dr Lewis published the first edition of his *New Dispensatory* in 1754. It consisted principally of a commentary upon the London and Edinburgh Pharmacopœias, of both of which it contained a complete translation. A concise system of the Theory and Practice of Pharmacy was prefixed as an introduction; and directions for extemporaneous prescription, with many elegant examples, and a collection of efficacious, but cheap remedies, for the use of the poor, were added as an appendix.

The manner in which the whole was executed, placed Dr Lewis at the head of the reformers of Chemical Pharmacy; for he contributed more than any of his predecessors to improve that science, both by the judicious criticism with which he combated the erroneous opinions then prevalent, and by the actual and important additions he made to that branch of our knowledge. He merited and received the decided approbation of the public. During his lifetime many editions were published, with such improvements as the advancement of the sciences connected with Pharmacy suggested.

After the death of Dr Lewis, an Edinburgh New Dispensatory was published with great improvements, rendered necessary by new editions of the Pharmacopœias, and increased knowledge of the natural history and chemistry of drugs. It was edited first by the late Dr Webster, and afterwards by Dr Duncan senior, and Dr Rotheram, in succession.

When the Edinburgh College were preparing to publish a new edition of their Pharmacopœia in 1800, the booksellers who purchased the copy-right of that work were desirous that it should be accompanied by a corresponding Dispensatory. This seemed to me absolutely necessary, not only in consequence of the progress of the sciences connected with medicine, but to revive the study of the chemistry of drugs.

During the latter period of the preceding century, Vegetable Chemistry had been very much neglected in this country; and the attention of chemists was directed almost exclusively to the discoveries of Black, Priestly, and Cavendish, and to the controversy between the adherents of the theory of Phlogiston, and those who espoused the opinions of Lavoisier.

Among physicians, Vegetable Chemistry was neglected, partly on account of the imperfect state of vegetable analysis, but more in consequence of the dogmatism of the Brunonian School, and the professional scepticism of Cullen, who represented the chemical analysis of drugs as of no use in explaining or ascertaining the virtues of medicines, and as unworthy of being studied by rational practitioners. It appeared to me that a very different view of the subject was more correct. Although the reaction excited by medicines in organs endowed with life is purely vital, and not to be explained by physical or chemical laws, yet medicines themselves are dead matters, and can only act in consequence of their physical or chemical properties. I therefore conceived, that the peculiar virtues of medicines must depend upon their chemical constitution, and that it was only by investigating the nature of the proximate principles of which they consist, and acquiring a knowledge of their properties, that we could rationally expect to make progress in Pharmacology.

Before becoming an author on these subjects, I considered it to be my duty to select, from the older writers, GEOFFROY, ROUELLE, and especially NEUMANN, whatever appeared to be still of value, and to ascertain, by actual experiments, many points, in regard to which, I was either unable to find satisfactory information, or met with contradictory statements. Although these experiments would now be considered rude, I have reason to believe, that they not only added to our information on the subject, but that from them, taken in conjunction with the facts collected from others, the early editions of the Edinburgh Dispensatory had some share in directing the attention of chemists to a field which had long lain fallow, but promised to reward the labour of cultivation.

In the second edition of DR THOMAS THOMSON'S very valuable System of Chemistry, published in 1804, he entered much more fully into the subject of Vegetable Chemistry than he had done in 1802, and enriched it with the results of many original experiments made by himself. Since that time it has received a due degree of attention from every systematic writer on chemistry; and great additions have been made to our knowledge of facts, especially by the Germans and

French, and in our own country by Sir H. Davy, Mr Chenevix, Mr Hatchett, and others.

It was also in 1804 that the late Dr John Murray published the first edition of his deservedly popular System of Materia Medica, which, by the perspicuity of its language, and the simplicity of its views, contributed not a little to raise the study in the estimation of the profession.

The promulgation of a new London Pharmacopœia in 1809, gave rise to a whole host of translators, commentators, and epitomizers, who executed their several plans more or less ably. Of these it will be sufficient to particularize Dr Powell, who published the authorised translation of the Pharmacopœia, with an explanation of the pharmaceutic processes; Mr A. T. Thomson, now M. D., who published, in the first place, a Conspectus, and afterwards, in 1811, the London Dispensatory, a work replete with information, and corresponding in its plan with the Edinburgh Dispensatory; Dr Paris, whose popular Pharmacology first appeared in 1812; Mr R. Phillips, who has most ably performed the duty of commentator on the London Pharmacopœia of 1825, an office which, on former occasions, was undertaken by a collegiate translator; and, lastly, Mr Brande, who has, on the same occasion, favoured the world with a Manual of Pharmacy.

During all this period, the Edinburgh Dispensatory has continued to receive the patronage of the profession. It has even been laid under heavy contribution, or rather been reprinted, without permission, in the London Medical Dictionary, and in the Family Herbal of Dr J. R. Thornton; and, with the addition of an account of the indigenous plants of the United

States, it constituted the American Dispensatory of Dr Coxe, (1806), and the New American Dispensatory of Mr Thacher, (1810); and was nevertheless avowedly reprinted in 1818 by Dr Dyckman, in a manner flattering to me, and creditable to himself.

The continued success of the Dispensatory, notwithstanding the publication of many able works of a similar nature, has been, in a great measure, owing to the numerous alterations and improvements made in each succeeding edition, so that it has not been allowed to fall behind the state of the science. I have not taken advantage of the productions of my competitors so often as I might have done; not from underrating their works, but because I thought it more advantageous to make generally known in this country the information on the subjects of pharmacology and pharmacy, which was published in Germany in the writings of Gren, Goettling, Trommsdorff, Sertuerner, Buchner, Brandes and Vogel; and in France by Fourcroy, Vauquelin, Seguin, Pelletier, Caventou, Henri, Braconnot and Chevreul.

In the present edition of the Dispensatory, the alterations and improvements are more numerous and important than on any preceding occasion. To make room for additional information upon the proper objects of the volume, I have altogether omitted the Epitome of Chemistry, which, however useful when first published, is now superseded by excellent publications appropriated to the subject; and although I have expunged every thing that I judged might be dispensed with, yet the size of the volume has been considerably increased.

I have considerably extended the Principles of Pharmacy, as being a subject of primary importance; and I have added many Tables connected with Pharmaceutic Chemistry, which I hope will be found useful. And here I must acknowledge my great obligations to the First Principles of Chemistry recently published by Dr THOMAS THOMSON. The new act regulating the weights and measures of the empire, which will soon come into operation, has caused the calculation of new tables in relation to the measures, which are considerably altered.

The part of the work devoted to Materia Medica has been increased by the few articles now first introduced into the last London Pharmacopœia; but it has been still more improved in consequence of our increased knowledge of the natural history of drugs already officinal; and to those belonging to the vegetable kingdom, I have added to the natural orders of LINNÆUS those of JUSSIEU, which have become the more important on account of the excellent works of DECANDOLLE and RICHARD.

The Chemical History of Simples has been improved by the introduction of the recent analyses of the more active vegetable substances; and their medical history has received many corrections and modifications from the clinical observations of myself, as well as of other practitioners.

In the Third Part of the work, the new London Pharmacopœia has necessarily caused many alterations; and I have endeavoured to avail myself of the progress of chemical knowledge, so far as it was applicable to the processes of pharmacy. In this department I have derived much advantage from the observations of Mr PHILLIPS.

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THE

EDINBURGH

NEW DISPENSATORY.

PART I.

ELEMENTS OF PHARMACY.

1. THE object of Pharmacy* is to provide those substances which may be employed for the prevention or cure of disease.

2. To obtain this object completely, an acquaintance with the physical and chemical properties of these bodies is necessary. This may be termed the *Science of Pharmacy.*

3. Few substances are found in nature in a state fit for their exhibition in medicine. The various preparations which they previously undergo constitute the *Art of Pharmacy.*

4. As a *Science,* Pharmacy is identical with Chemistry; but as an *Art,* it has a limited object; and for its successful practice, an intimate acquaintance with the peculiar application of its principles is necessary.

5. The practice of pharmacy consists in,
   - *a.* The collection and preservation of simples.
   - *b.* The performance of the processes to which it is often necessary to subject them.

---

[*] Pharmacy is from φαρμακον, a drug, poison, or pigment. Pharmacopolist is from φαρμακοπωλης, a seller of drugs. Αποθηκη, from which apothecary is derived, literally means a storehouse, in which substances are collected and preserved for use. Herbalist, druggist, distiller, chemist, and manufacturing chemist, are denominations given to those who practise particular branches of the art.

6. A complete pharmaceutical establishment includes various departments, for carrying on which a suite of apartments is necessary.

a. The shop.
b. The store.
c. The laboratory.

7. The *shop* is where the medicines are dispensed and sold, prescriptions are compounded, and a sufficient quantity of each of the officinal simples and preparations is kept in readiness for immediate use.

8. An apothecary's shop should be roomy, well lighted, remarkably clean, even elegant, and well arranged.

9. In the arrangement, the chief objects are to diminish labour, to prevent mistakes and accidents, and to be easily understood by new assistants.

10. The *store* must consist of different apartments, of two kinds.

a. One adapted for substances which sustain the ordinary changes of the temperature of the atmosphere without suffering any material change, but which are soon spoiled by damp,—the *herbarium*, herb-loft, drug warerooms.

b. Another for substances which are injured by great heat or cold, and for which a moderate or cool, but uniform temperature, between 32° and 55°, is suited,—the cellar, or *aquarium*.

11. The *laboratory* also requires several apartments.

a. The proper chemical laboratory.
b. The powdering room.
c. The drying room.

12. The laboratory should be lofty, spacious, well lighted, with good flues and open chimneys, and an arched fireproof roof, well supplied with water, and have a good sink and drain. It should have all the fixed chemical apparatus properly disposed, as furnaces, sand-bath, steam apparatus, &c. There should be proper and well-secured shelves and racks for the moveable apparatus, as all kinds of glass vessels, crucibles, kettles, pans, ladles, mortars, &c.

13. The process of powdering, when on a considerable scale, must be carried on in a separate apartment, on account of the dust and noise, and the space required for the machinery.

14. A drying room, in which a constant temperature of from 100° to 120° is kept up by heated air or a sand bath, is a great advantage, for the drying quickly of vegetable and other simples, the digestion of tinctures, and slow evaporation.

15. The articles to be provided by the apothecary have been divided by the editors of pharmacopœias, but not very correctly, into,

a. Materia Medica, or Simples.
b. Composita and *Præparata.*

16. Many substances commonly enumerated among the *Materia Medica* are in reality prepared, but supposed to be purchased by the apothecary in their prepared state, and others in the same list require from him the most careful preparation.

17. Many articles, for the preparation of which *formulæ* are given in the pharmacopœias, are never prepared by the apothecary himself, but purchased from manufacturing chemists.

18. The articles used in medicine, whether simple or prepared, are, either,

a. Foreign, or
b. Indigenous.

19. The foreign articles are purchased from wholesale druggists or merchants who import them, and much knowledge is requisite to judge of their genuineness and quality. **Waarenkunde** of the Germans.

20. Indigenous articles are either collected by the apothecary himself, or purchased from persons who make a trade of collecting them.

COLLECTION AND PRESERVATION OF SIMPLES.

21. Each of the kingdoms of nature furnishes substances which are employed in medicine, either in their natural state, or after they have been prepared by the art of pharmacy.

22. In collecting these, attention must be paid to get such as are genuine, to select such as are most sound and perfect, to separate from them whatever is injured or decayed, and to free them from all foreign matters.

23. Those precautions must be taken which are best fitted for preserving them. They must, in general, be defended from the effects of moisture, too great heat or cold, and confined air.

24. When their activity depends on volatile principles, they must be preserved from the contact of the air as much as possible.

25. When they are acted upon by light, so as to have their sensible qualities altered, and their virtues impaired, they must be carefully protected against its influence.

26. Medicinal substances differ so much in their nature, that special directions are required for each kind.

27. *Vegetable simples.*—As the vegetable kingdom presents us with the greatest number of simples, and the substances belonging to it are the least constant in their properties, and most subject to decay, it becomes necessary to give a few general rules for their collection and preservation.

28. Vegetable matters should be collected in the countries where they are indigenous *; and those which grow wild, in dry soils and high situations, fully exposed to the air and sun, are in general to be preferred to those which are cultivated, or which grow in moist, low, shady, or confined places †.

29. *Roots.*—Annual and biennial roots are either fibrous, merely to nourish the plant, or fleshy, as a useful product of vegetation. Annual or biennial fibrous roots are rarely used; but the fleshy roots are sometimes used in medicine, and often as food, as the carrot and turnip. These roots are perfect before they shoot up the flower stem, after which they become stringy and sapless. The annual tubers of the potatoe are now an indispensable article of food.

30. Perennial roots should also be collected during winter; because they then abound with the proper juices elaborated by the leaves of the preceding season, laid up in the roots to feed the shoots of next spring; and because roots are apt to bleed when wounded after the vegetation has commenced.

31. Bulbous roots should be collected after the new bulb is perfected, and before it has begun to vegetate, or after the leaves of the season have decayed, in consequence of having performed their functions.

32. Roots of herbaceous perennial plants should be collected in autumn after the stem drops, and is still attached; or the places where they grow, and even fine plants, should be marked during the preceding summer. At any rate, great knowledge of their *habitats* is necessary to prevent mistakes.

33. Ligneous roots of shrubs and trees, as mezereon, are to be gathered during winter, when vegetation is dormant.

34. All roots which are worm-eaten, or are decayed, are to be rejected. The others are immediately to be cleaned with a brush and cold water, letting them lie in it as short a

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* Some vegetable drugs are greatly improved by cultivation, as all the fruits; and others are not to be otherwise procured, as the *cerealia*, or not in sufficient quantity, as many aromatics, flowers and plants.

† Some plants grow only in the shade; and succulent plants, which grow in exposed situations, furnish little juice. But no plant should be at all etiolated.

time as possible; and the fibres and little roots, when not essential, are to be cut away.

35. Roots which consist principally of fibres, and have but a small tap, may be immediately dried. If they be juicy, and not aromatic, this may be done by heat, not exceeding 100° of Fahrenheit; but if aromatic, by simply exposing them, and frequently turning them in a current of dry air; if very thick and strong, they are to be split or cut into slices, and strung upon threads; if covered with a tough bark, they may be peeled fresh, and then dried. Farinaceous roots are to be dipt in boiling water before they are dried. Such as lose their virtues by drying, or are directed to be preserved in a fresh state, are to be kept buried in dry sand, or as potatoes. Ginger is peeled, and preserved in syrup.

36. *Leaves.*—The proper period for gathering leaves depends upon their nature. All leaves are unfolded, reach their full size, and decay within a certain space of time. Young leaves are more tender and succulent, and contain more water and common sap. In full-grown leaves the proper juices are most perfect. Some leaves, especially articles of aliment, are preferred when young and delicate, as sorrel, spinach; others of a middle growth, as tea, because the flavour is evolved, but still delicate; and others when full grown, as then most powerful.

37. *Herbs* whose stem is annual are gathered as leaves. Aromatic herbs after the flower-buds are formed, or when in flower, for till then they do not acquire their full flavour.

38. Leaves and herbs are to be gathered in dry weather, after the dew is off them, or in the evening before it falls, and are to be freed from decayed or foreign leaves. They are usually tied in bundles, and hung up in a shady, warm, and airy place, or spread upon the floor, and frequently turned. If very juicy, they are laid upon a sieve, and dried by a gentle degree of artificial warmth.

39. *Sprouts* and *buds* are collected in spring before the leaves expand.

40. *Stalks* and *twigs* are gathered in autumn.

41. *Barks* and *woods* are collected in spring or in autumn, when the most active parts of the vegetables are concentrated in them. Spring is preferred for resinous barks, and autumn for the others which are not resinous, but rather gummy. Barks should be taken from trees of moderate age, and freed from epidermis, decayed parts, and all impurities.

42. The same rules are to be followed in collecting woods. Among the resinous woods, the heaviest, which sink in water, are selected. The *alburnum* sap-wood or splint is to be rejected.

43. *Flowers* and *flower buds* are to be collected in clear dry weather, before noon, but after the dew is off, either when they are just about to open, or immediately after they have opened. Of some, the petals only are preserved, and the colourless claws are even cut away; of others, whose calyx is odorous, the whole flower is kept. Flowers which are too small to be pulled singly, are dried with part of the stalk; these are called *heads* or *tops*.

44. Flowers are to be dried nearly in the same manner as leaves, but more quickly, and with more attention. As they must not be exposed to the sun, it is best done by a slight degree of artificial warmth; and in some cases they should be put up in paper bags. When they lose their colour and smell, they are unfit for use.

45. *Fruits*, unless when otherwise desired, are to be gathered when fully ripe, but before they fall spontaneously.

46. Some pulpy fruits are freed from their core and seeds, strung upon thread, and dried artificially, by exposing them repeatedly to the heat of a stove. They are in general best preserved in their natural coverings, although some, as the colocynth, are peeled, and others, as the tamarind, immersed in syrup.

47. *Seeds* are gathered fully ripe. Many fruits and seeds are apt to spoil, or become rancid; and as they are then no longer fit for medical use, no very large quantity of them should be collected at a time.

48. The mucilaginous and farinaceous seeds are to be dried by artificial heat, but the oily and emulsive have their disposition to rancidity increased by very slight elevations of temperature, and must therefore be dried in a very airy cool place.

49. *Mosses*, *lichens* and *fungi* are gathered after their full development, and require particular care in cleaning them from foreign and other matters; and some of the *fungi* must be dried very rapidly.

50. *Resins*, gum-resins, balsams, turpentines and gums, are all foreign productions, and their preservation requires little attention.

51. The proper drying of vegetable substances is of the greatest importance. It is often directed to be done in the shade, and slowly, that the volatile and active particles may not be dissipated by too great heat: but this is an error; for they always lose infinitely more by slow than by quick drying. When, on account of the colour, they cannot be exposed to the sun, and the warmth of the atmosphere is insufficient, they should be dried by an artificial warmth, less than

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100° Fahrenheit, and exposed to a free current of air. When perfectly dry and friable, they have little smell; but after being kept some time, they attract moisture from the air, and regain their proper odour.

52. The boxes and drawers in which vegetable substances are kept, should not impart to them any smell or taste; and more certainly to avoid this, they should be lined with white paper. Such as are volatile, of a delicate texture, or subject to suffer from insects, must be kept in well-covered glasses.

53. Fruits, oily seeds, odorous plants, and those containing volatile principles, should be collected fresh every year; others, whose properties are more permanent, and not subject to decay, will keep for several years.

54. Vegetables collected in a moist and rainy season are in general watery, and apt to spoil. In a dry season, on the contrary, they contain more oily and resinous particles, are more active, and keep much better.

55. Notwithstanding the most careful preparation and preservation, vegetable substances undergo a gradual decomposition, indicated by change of colour, loss of smell and virtue, or becoming musty or rancid, and therefore they should be frequently examined and rejected when these changes appear.

56. Few *animal substances* are used in medicine, none collected by the apothecary in this country.

57. *Fats* become rancid by keeping; and *insects* are destroyed by insects.

58. *Castor*, musk, isinglass, crabs' eyes, oyster shells and hartshorn, keep any length of time.

59. *Mineral substances* require only to be kept from dust and foreign matters.

MECHANICAL OPERATIONS OF PHARMACY.

a. The determination of the weight and bulk of bodies.
b. The division of bodies into more minute particles.
c. The separation of their integrant parts by mechanical means.
d. Their mixture when not attended by any chemical action.

WEIGHTS AND MEASURES.

60. The quantities of substances employed in pharmaceutical operations are most accurately determined by the process called weighing.

61. The instruments for determining weights are,

a. Balances.

b. Steelyards, on the principle of the lever.

c. Steelyards with a compressible spring.

62. The last is convenient from the facility with which it is used. The second is used chiefly for great weights. But the first is the only instrument fit for pharmaceutical purposes, as it is the most accurate, and may be made to check itself, by reversing the position of the weight and of the substance weighed.

63. There should be sets of beams and scales of different sizes; and it would be advisable to have a double set, one for ordinary use, and another for occasions when greater accuracy is necessary. A good beam should remain in equilibrium both by itself and when the scales are suspended, one to either end indifferently; and it should turn sensibly with a very small proportion of the weight with which it is loaded. Balances should be defended as much as possible from acid and other corrosive vapours, and should not be overloaded, or left suspended longer than is necessary, as their delicacy is thereby very much impaired. It is unfortunately not unnecessary to mention, that the scales and weights, as well as measures, funnels, mortars, &c. should be kept extremely clean. Some nice apothecaries have their scales made of glass, ivory, or tortoise shell; but in some shops the common brass scales are disgustingly filthy, and covered with verdegris.

64. The weights themselves are pieces of metal previously adjusted by a public officer. Those for grains, scruples, drachms and ounces are made of brass; those for fractions of grains, and for chemical purposes, of silver wire; and those for pounds and larger weights of cast-iron or lead. They are made of various forms. The grains are generally flat, to give them sufficient extension, with an edge turned up and marked with the number of grains they weigh. The scruples, drachms and ounces are of various forms, square, discs, or cup-shaped, constituting piles or sets.

65. The want of uniformity of weights is attended with many inconveniences. In this country, druggists and grocers have been accustomed to sell by avoirdupois weight; and the apothecaries are directed to sell by troy weight, although, in fact, they seldom use the troy weight for more than two drachms. But as the troy pound is less than the avoirdupois, and the ounce and drachm greater, numerous

and culpable errors must have arisen *. Comparative tables of the value of weights are given in the Appendix.

66. The errors arising from the promiscuous use of weights and measures have induced the Edinburgh College to reject the use of measures entirely, and to direct that the quantity of every fluid, as well as solid, shall be determined by troy weight: But as the London and Dublin colleges sanction the use of measures, and as, from the much greater facility of their employment, apothecaries will always use them, tables of measures are also inserted in the Appendix.

67. For measuring fluids, the graduated glass measures are always to be preferred: they should be of different sizes according to the quantities they are intended to measure. Elastic fluids are also measured in glass tubes and jars, graduated by inches and their decimals.

68. The practice of administering active fluids by drops is very inaccurate. Not only do the drops of different fluids from the same vessel, and of the same fluids from different vessels, differ much in size; but it appears that the drops of the same fluid differ, even to the extent of a third, from different parts of the lip of the same vessel. The custom of dropping active fluids should, therefore, be abolished entirely; and, as weighing is too troublesome and difficult for general use, we must have recourse to small measures accurately graduated, in the manner of Lane's *drop* measure, and the *grain* measure recommended by the Edinburgh college; but we must not be misled by their names; for they are measures of bulk, not of drops or of grains.

69. In old times, pharmaceutists were contented with very rude methods of measuring some substances; such as, *manipulus*, a handful, and *pugillus*, a pinch, or as much as could be taken up by the thumb and two fore-fingers.

SPECIFIC GRAVITY.

70. Specific gravity is the comparative weight of equal bulks of different bodies. As a standard of comparison, distilled water at a certain temperature (62° Fahrenheit) has been generally assumed as unity.

71. The specific gravity of any solid heavier than water is ascertained, by comparing the weight of the body in the air with its weight when suspended in water. The quotient

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* This evil will in future be obviated, when the act for establishing uniformity of weights and measures comes into operation, which enjoins that the troy weight shall be the only weight used.

obtained by dividing its weight in air, by the difference between its weight in air and its weight in water, is its specific gravity.

72. When a solid is lighter than water, it must be rendered heavier by attaching to it a heavy solid. From the loss of weight which when united they sustain on being immersed in water, the loss of weight of the heavier alone is subtracted; the remainder expresses the loss of weight sustained by the lighter; and by dividing by this its weight in air, the quotient is its specific gravity.

73. The specific gravity of fluids may be ascertained by comparing the loss of weight of a solid body, such as a piece of crystal, when immersed in distilled water, with its loss of weight when immersed in the fluid we wish to examine; by dividing its loss of weight in the fluid by its loss of weight in the water, the quotient is the specific gravity of the fluid: A balance adapted for this purpose is called a hydrostatic balance. Another method is by means of a small phial, called a weighing bottle; and by dividing its increase of weight when filled with the fluid to be examined, by its increase of weight when filled with distilled water, the specific gravity of the fluid is ascertained.

74. The specific gravity of gases and vapours is also ascertained by the weighing bottle, but is an operation of the greatest difficulty, and never performed for pharmaceutical purposes.

75. Although these are the only general principles by which specific gravities are ascertained, yet as the manipulation is a work of great nicety, various ingenious instruments have been contrived to render the process and calculation easy, under the various appellations of hydrometers, gravimeters, alcoholimeters, saccharometers, &c., and sets of a series of beads adjusted to remain *in equilibrio* in fluids of different specific gravities, as made by M. Lovi, shew the weight of any fluid under trial by mere inspection.

76. The result is always influenced by the state of the thermometer and barometer at the time of the experiments; a standard for these is therefore assumed, and corrections must be made for any deviation from it at the time of making the experiment.

77. It would be of material consequence to science and the arts, if specific gravities were always indicated by the numerical term expressing their relation to the specific gravity of distilled water. This, however, is unfortunately not the case. The excise in this country collect the duties paid by spirituous liquors, by estimating the proportion which

they contain of a standard spirit, about 0.933 in specific gravity, which they call hydrometer proof; and they express the relation which spirits of a different strength have to the standard spirit, by mentioning how many degrees they are above or under hydrometer proof.

78. The only other mode of expressing specific gravities which it is necessary to notice, is that of Baumé's areometer, as it is often used in the writings of the French chemists, and is little understood in this country. For substances heavier than water, he assumes the specific gravity of distilled water as zero, and graduates the stem of his instrument downwards, each degree being supposed by him to express the number of parts of muriate of soda contained in a given solution; which, however, is not at all the case. For substances lighter than water the tube is graduated upwards, and this zero is afforded by a solution of 1 of salt in 9 water. In the Appendix, tables are given of the specific gravities, corresponding with the degrees of both of these areometers.

79. The specific gravity of the gases and vapours differs so much from that of water, that it cannot be used as unity in regard to this class of substances; but philosophic chemists unfortunately have differed in their selection of a proper standard, some preferring atmospheric air, others hydrogen, and others oxygen.

MECHANICAL DIVISION.

80. Mechanical division is necessary on many occasions;
  a. To admit of certain definite quantities being taken from the whole.
  b. To promote chemical and therapeutical action.
  c. To give an appropriate form.

81. It is performed in different ways, and by different means, according to the different forms of aggregation and the end in view.

82. The forms of aggregation are,
  a. *Solid*, in which the attraction of cohesion resists relative motion among the particles, more or less perfectly, and the fragments are angular, and do not reunite on being placed in contact.

The chief varieties of this form of aggregation are,
  aa. Hard, affording sparks with steel.
  bb. Semihard, giving no sparks with steel.
  cc. Soft, easily cut by the knife.
  dd. Very soft, yielding to the nail.

- *b. Semifluid* or semisolid, intermediate between solid and fluid; admitting of a certain degree of relative motion among the particles; fragments scarcely angular, and easily reunited by pressure.
  - *aa.* Plastic, as chalk and oil.
  - *bb.* Short, as chalk and water.
- *c. Fluid*, which admits of relative motion among the particles, with greater or less facility, and small portions have a tendency to assume a globular form, and readily reunite on coming into contact.
  - *aa.* Thin or limpid.
  - *bb.* Thick or viscid.
- *d. Gaseous*, in which the particles repel each other.

83. Other physical properties influence the mechanical division of bodies, as tenacity, frangibility, and flexibility.

84. *Frangibility* is not the opposite of hardness. Glass is hard, and horn comparatively soft, but the former is much more frangible than the latter. The degrees of frangibility are expressed by common epithets; as very difficultly frangible, as horn, nux vomica; and very easily frangible, as chalk.

85. *Tenacity* depends upon the degree of cohesion among the particles. In this point of view, bodies are,

- *a.* Ductile, or may be expanded under the hammer, or drawn into wire.
- *b.* Sectile or mild; may be cut with a knife, without emitting a grating sound, or particles flying off.
- *c.* Brittle; particles entirely immoveable, and on cutting emit a grating sound, and fine particles fly off.

86. *Flexibility* is possessed by those bodies which bend without breaking. Its kinds are,

- *a.* Common flexibility, when the body remains in whatever position is given to it.
- *b.* Elasticity, when, after being bent, it recovers its original position.
- *c.* Elastic extensibility, as observed in caoutchouc.

87. The modes of overcoming the force of aggregation are very various.

- *a.* Cutting with a sharp edge.
  - *aa.* Slicing with a knife, as liquorice root.
  - *bb.* Shaving with a plane, as hartshorn.
  - *cc.* Turning on a lath, as ivory, guaiac wood.
  - *dd.* Clipping with scissars, or a knife and board.
  - *ee.* Splitting by wedges.
- *b.* Tearing into small fragments by a succession of wedges.

aa. Sawing,—marble, ivory, horn.
bb. Rasping, filing,—wood, iron.
cc. Grinding,—meal, flour.
dd. Friction on a sieve,—magnesia, carbonate of lead.

c. Bruising or crushing.

aa. Trituration in flat mortars of glass, agate, or other hard materials, by giving a rotatory motion to the pestle, for dry, friable substances of an oily or resinous nature, which are apt to heat and soften by contusion.

bb. Porphyrization upon a slab of porphyry or other hard stone, by means of a muller of the same nature. The substance is always previously powdered and moistened with water or other fluid, so as to form a soft paste; and the object, which is to reduce it to an impalpable powder, is known to be complete, when a little rubbed between the fingers enters into the pores of the skin, and is not easily removed.

cc. Crushing beneath a heavy cylinder, rolled over the substance to be crushed, laid upon a hard floor or bed.

dd. Crushing between a pair of rollers, which may be either plain, as those for extending metal plates, or fluted, for crushing soft substances, as fruits.

ee. Bursting by mere compression with the hands, arms, feet, or machinery, chiefly used for obtaining the juice of fruits and berries, as grapes.

d. Comminution by contusion is employed,

aa. To separate the fibres of very fibrous substances, as flax.

bb. To beat soft substances, as hemlock leaves or roots, to a pulp.

cc. To reduce to powder all substances sufficiently brittle which do not cake under the pestle.

88. *Pulverization* is performed, either,

a. By machinery, as in stamping-mills for powdering mineral ores, or for vegetable powders, bark mills; or,

b. By the hand, sometimes assisted by machinery. For this purpose a pestle and mortar are employed, and the process is performed by repeated strokes of the pestle on the substance to be powdered, laid upon the bottom of the mortar.

89. The materials of which the pestles and mortars are formed, should resist both the mechanical and chemical action of the substances for which they are used. Wood, iron,

marble, siliceous stones, porcelain, and glass, are all employed; but copper, and metals containing copper, are to be avoided. In the selection of materials, the general rule is, that they be sufficiently hard, and are not acted upon by the substances for which they are used.

90. The general form of a mortar is also various; deep, shallow, or flat. Of deep mortars, the bottom should be concave; and their sides should neither be so inclined as not to allow the substance operated on to fall to the bottom between each stroke of the pestle, nor so perpendicular as to collect it too much together, and thus to retard the operation.

91. Mortars generally should be provided with covers;

a. To prevent loss, from the finest and lightest parts escaping; and,

b. To defend the operator from the effects of disagreeable or noxious substances. But these ends are more completely attained, by tying a piece of pliable leather round the pestle, and round the mouth of the mortar. It must be closely applied, and at the same time so large, as to permit the free motion of the pestle.

92. In some instances, it will be even necessary for the operator to cover his mouth and nostrils with a wet cloth, or Gosse's sponge mask, and to stand with his back to a current of air, that the very acrid particles which arise may be carried from him.

93. The addition of a little water or spirit of wine, or of a few almonds, to very light and dry substances, will prevent their flying off. But almonds are apt to induce rancidity, and powders are always injured, by the drying which is necessary when they have been moistened. Water must never be added to substances which absorb it, or are rendered cohesive by it.

94. There are various means by which the process of pulverization may be facilitated.

a. By operating on a proper quantity at a time; too little causes a great waste of labour; too much very greatly retards the operation. The separation from time to time, by means of a sieve, of what is sufficiently powdered, also facilitates the pulverization of what remains.

b. By previous preparation; woods, roots, barks, should be previously cut, split, chipped, or rasped. Fibrous woods and roots should be finely shaved after their bark is removed, for otherwise their powders will be full of hair-like filaments, which can scarcely be separated.

c. By attention to the temperature.

- *aa.* Some metals, ductile at ordinary temperatures, become pulverizable at high temperatures. Zinc is pulverizable at 400°; but very malleable at 212°, and slightly so at 60°.
- *bb.* Some earthy minerals crack and splinter and become pulverizable on being heated.
- *cc.* Some substances are more frangible at an increased temperature, as tragacanth, nux vomica.
- *dd.* Some become pulverizable at a low temperature, as resins, gum-resins, wax.
- *ee.* All substances which contain water become pulverizable on being frozen, as muscular flesh.

c. By state of moisture.

- *aa.* Some substances have their tenacity reduced by being soaked in water; but they scarcely become friable, but may be bruised.
- *bb.* All organic substances become more frangible by perfect exsiccation.
- *cc.* All salts which contain much water of crystallization become more frangible by having it driven off.

d. By means of certain additions.

- *aa.* Alcohol, as to camphor.
- *bb.* Water, some orchis roots are first wetted and then dried.
- *cc.* Tragacanth mucilage, squill, colocynth and viper's flesh, may be powdered after being soaked in this, and again dried.
- *dd.* Some dry meagre powders; vanille is rubbed to powder with sugar.

95. In general all impurities and inert parts having been previously separated, the operation must be continued and repeated upon vegetable substances till no residuum is left. The powders obtained at different times must then be intimately mixed together, so as to bring the whole to a state of perfect uniformity. But in some instances a preference is given to the powder obtained at different periods of the process, though upon doubtful grounds.

a. Of cinchona and cascarilla, the first portion obtained is directed to be rejected, as furnished by the epidermis and lichens adhering to it, and the last is preferred as being more resinous.

b. Of liquorice and althæa root, the first portion is preferred, and the last rejected as being too fibrous.
c. Of jalap, rhubarb, gentian, elecampane, cinnamon and Winter's bark, the whole is preserved.

96. *Granulation* is employed for the mechanical division of some fusible substances. It is performed by agitating the substance in its passage from a fluid to a solid state;
a. By stirring with a rod, as sub-carbonate of potass, sugar.
b. By shaking along with a substance to keep the grains divided,—phosphorus, tin.
c. By pouring through a cullender, into water, or from a great height,—common and patent shot.

97. Pulverization is sometimes effected by chemical means.
a. By the addition of water, as in the slaking of lime.
b. By the abstraction of water, as in the efflorescent salts.

MECHANICAL MIXTURE.

98. Mechanical mixture is often employed to mingle bodies of all forms of aggregation with others of the same form or of different forms.
a. Of dry powders with each other, by stirring and trituration.
b. Of dry with soft substances, as in the formation of pill masses with extracts, by beating and kneading.
c. Of soft substances with each other, by beating and kneading.
d. Of dry with fluid—diffusion and suspension, by gradually adding the fluid and rubbing.
e. Of soft with fluid, by adding the fluid gradually and rubbing.
f. Of fluid with fluid, by agitation in a phial.

MECHANICAL COMBINATION.

99. Mechanical combination is when, by mechanical means, substances are made to act chemically on each other; as when sulphate of copper is triturated with carbonate of ammonia, or acetate of lead with sulphate of zinc.

MECHANICAL SEPARATION.

100. By mechanical means we are often enabled to separate from each other substances only mechanically mingled.

Solids are separated from solids in various ways.

- *a.* Finer from coarser powder of the same kind. Sifting, tamisation.
- *b.* Round from ill-shaped grains; as in lead shot.
- *c.* Lighter from heavier powders of different kinds:
  1. Winnowing.
  2. Separation of metallic from earthy particles.
  3. Elutriation.
- *d.* Iron-filings from other metallic powders by means of a magnet.

101. *Sifting.*—Powders of different degrees of fineness are separated,

- *a.* For the sake of the finer powder in most instances;
- *b.* For the sake of the coarser powder, as in the making of *Species*.

102. It is performed by a sieve; the finer powder being made to pass through its interstices, while the coarser powder is retained.

103. The materials of which sieves are composed are very various.

- *a.* Metals; iron, copper, brass, silver.
- *b.* Wood, chip, split cane, hempen cloth, linen or cotton.
- *c.* Split whalebone, hair-cloth, silk, *(tamis)*.

104. Sieves are of various degrees of fineness, according to the purpose for which they are used.

- *a.* Coarse; called screens, riddles.
- *b.* Fine; sieves, searces, bolters.

105. A sieve consists essentially of the sifting material, attached to a frame, which determines its form. The frame is sometimes square, but most commonly a cylindrical hoop, over one end of which the sifting material is stretched. In bolting mills it is wrapped around an open cylindrical frame.

106. Compound sieves have a close lid and receiver, so that nothing, either valuable or deleterious, can escape.

107. Dusting bags are formed of the sifting material, and are generally inclosed in a very close box, which serves as a receiver for the fine powder which is shaken through the bag.

108. The manipulation by which the fine powder is made to pass through the sieve is various: The sieve itself is either shaken gently, or struck upon a hard body *; or if the sieve be cylindrical, it is either whirled round upon its axis, or it is left at rest, and the fine powder forced through by means of brushes carried round upon an axis.

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* This is objected to by Caventou, as forcing through a coarser powder.

109. *Elutriation* is performed on substances upon which water has no action.

- *a.* For the sake of the heavy powder, for freeing it from all lighter foreign particles and impurities; in which case it is said to be washed; used for preparing granulated tin, and often in metallurgy.
- *b.* For the sake of the impalpable powder obtained by trituration and levigation, by freeing it from the coarser particles; used for all prepared powders, either earthy, as chalk,—or metallic, as sulphuret of antimony, carbonate of iron, &c.

110. The process of elutriation depends on the property that very fine or light powders have of remaining for some time suspended in water; and is performed by diffusing the powder or paste formed by levigation through much water, letting it stand a sufficient time, until the coarser particles settle at the bottom, and then pouring off the liquid in which the finer or lighter particles are suspended. Fresh water may be poured on the residuum, and the operation repeated; or the coarser particles which fall to the bottom may be previously levigated a second time. The fine powder which is washed over with the water is separated from it, by allowing it to subside completely, and by decanting off the water very carefully.

111. Solids are separated from fluids by

- *a.* *Deposition*, or allowing them to subside, which can only be employed when there is no tendency to decomposition. The supernatant fluid is then separated by
  - *aa.* *Decantation*, which is very frequently made use of for separating the clear from the turbid part of a fluid, and for separating fluids from solids which are specifically heavier, especially when the quantity is very large, or the solid so subtile as to pass through the pores of most substances employed for filtration, or the liquid so acrid as to corrode them.
  - *bb.* By drawing it off by a syringe or pump.
  - *cc.* By drawing it off by a syphon, which may be either simple or compound.
  - *dd.* By capillary threads, which is a species of filtration *per ascensum.*
- *b.* By *filtration*, which is employed when the powder either does not subside at all, or too slowly and imperfectly for decantation.

112. There are two kinds of filtration:

a. Per descensum; the common method, in which the fluid passes downwards through the filter, and of course through the powder deposited upon it.

b. Per ascensum; when the fluid and the powder are made to take opposite directions.

113. In regard to filters, strainers and drainers, the circumstances to be attended to are the materials, form, size, weight and support.

114. The materials of which filters are made, should, as much as possible,

a. Resist the chemical action of the substances for which they are to be used;

b. Be sufficiently porous to allow the fluid to pass readily, and yet sufficiently close to retain the finest powder;

c. Be not spongy to absorb much of the fluid.

115. Metallic filters or strainers are made of iron, tinplate, copper, brass or silver, either plates pierced with small holes, or wire woven into cloth. They are not close in the pores, and are apt to be acted upon by acids, but they do not absorb.

116. Earthy materials are also used. Strainers are made of Wedgwood's ware; but sand, porous stone and artificial stone will serve as filters. They are porous, and apt to get foul.

117. Many vegetable substances are used. Wood is used for mercury. Fats, resin and wax are strained through straw, hemp or flax. Linen, hemp and cotton cloth or muslin are very frequently employed; but for obtaining very limpid fluids, unsized colourless paper must be used.

118. Animal substances are also employed. Hair, wool, silk, commonly woven into cloth; also leather and sponge are adapted to some cases.

119. The form of filters is either more or less flat and stretched; or a conical bag, often called Hippocrates's sleeve. Paper is folded so as to form a cone, and, as much as possible, a ribbed cone, of equal thickness in every part.

120. The size must be adapted to the quantity to be filtered. When large, they absorb too much, and are apt to burst by the weight of the liquid put into them. Large quantities must be filtered by repetitions of the process. When very small, the operation is tedious, as a certain weight of fluid is required to force the pores.

121. In very accurate experiments, it is necessary to as-

certain exactly the weight of the filter, before commencing the process.

122. In most cases a frame and support are necessary. Cloth and leather filters are often attached to a hoop or square frame, or they may be put into a wicker cone. Paper is placed in a funnel, or spread on the inside of a flannel bag. Ribbed funnels expedite the operation, or glass rods may be placed between the paper and funnel. In some cases inconvenience arises from the capillary attraction of the paper, especially when it does not reach to the edge of the funnel. This may be obviated by dipping the edge of the paper in melted tallow.

123. What passes first is seldom fine enough, and must be poured back again, until by the swelling of the fibres of the filter, or filling up of its pores, the fluid acquires the requisite degree of limpidity. The filter is sometimes covered with charcoal powder, which is a useful addition to muddy and deep coloured liquors. The filtration of some viscid substances is much assisted by heat.

124. Stands for suspending the funnels and filters are necessary, as, when full, they are easily overturned, and, in many cases, covers are required, not merely to keep out the dust, but to prevent the access of the air.

125. Many compound and complicated filtering apparatuses have been invented.

126. *Expression* is a species of filtration, assisted by mechanical force. It is employed,

- *a.* For the sake of the fluid expressed;
  - *aa.* Recent vegetable juices.
  - *bb.* Fixed oils; linseed, almond, castor, croton, oils, tallow, lard.
  - *cc.* Volatile oils; lemon, bergamot.
  - *dd.* Infusions, decoctions, chemical solutions.
- *b.* For the sake of the residuum.
  - *aa.* To dry spongy precipitates, as in preparing sulphate of quina.
  - *bb.* Elaterium, cheese.

127. Some preliminary operations are commonly necessary for expression to succeed.

- *a.* Mechanical comminution, by cutting, rasping, bursting, crushing, to open the cells in which fluids are contained.
- *b.* A certain degree of heat to render fixed oils more fluid. For unctuous seeds iron plates are used; and

it is customary not only to heat the plates, but to warm the bruised seeds in a kettle over the fire, after they have been sprinkled with water, as by these means the product is increased, and the oil obtained is more limpid. But as the oils procured in this way are more disposed to rancidity, this process should either be laid aside altogether, or changed to exposing the bruised seeds, inclosed in a bag, to the steam of hot water.

128. Vegetables intended for this operation should be perfectly fresh, and freed from all impurities. In general they should be expressed as soon as they are bruised, for they are then disposed to ferment; but subacid fruits give a larger quantity of juice, and of finer quality, when they are allowed to stand some days in a wooden or earthen vessel after they are bruised. To some vegetables which are not juicy enough, the addition of a little water is necessary; but it is said to alter the nature of the extracts thus obtained. Lemons and oranges must be peeled or pared, as their skins contain a great deal of essential oil, which would mix with the juice.

129. Except some fruits, especially those of considerable size, such as lemons and oranges, of which the juice may be squeezed directly from the skins or husks, vegetable pulps are inclosed in a bag, through which the juice is to be squeezed by the action of a press. The bags should be of hair-cloth, or canvas inclosed in hair-cloth. Hempen and woollen bags are apt to give vegetable juices a disagreeable taste.

130. The mechanical force used for expression may be,

a. Merely manual, as we express the oil from lemon peel, or the juice from grapes and various berries.

b. Manual aided by a simple instrument, as in the hinged and conical lemon squeezers.

c. By more powerful machinery.

aa. The common screw-press, with plates of wood, iron or tin.

bb. Box screw-press.

cc. Ruthven's eccentric wheel press.

dd. Hydrostatic press. Bramah's, Real's, Römershausen's.

In all these cases the pressure should be gentle at first, and increased very gradually.

ee. By wedges to give sudden pressure, as in the oil press.

131. *Clarification* is a species of filtration. It is performed,

a. Without addition, when the liquor contains a principle coagulable by heat. This, on heating the liquid sufficiently, separates and carries up all impurities with it, in the form of scum.

b. By adding coagulable substances, as by mixing with the liquor, when cold, white of egg well beaten with a little water. This also on being heated coagulates, and rises to the surface, carrying with it all the impurities. The liquor may now be filtered with ease, or may be skimmed with a perforated laddle.

Spiritous liquors are clarified, without the assistance of heat, by means of isinglass dissolved in water, or of any albuminous fluid, as milk, which coagulates with the action of alcohol.

Some expressed juices, as those of the antiscorbutic plants, are instantly clarified by the addition of any vegetable acid, as the juice of bitter oranges, which throws down coagulable matter.

132. Fluids can be separated from each other only when they have no tendency to combine, and when they differ in specific gravity. The separation may be effected by skimming off the lighter fluid with a silver or glass spoon; or by drawing it off by a syringe or syphon; or by means of a glass separatory, which is an instrument having a projecting tube rising from the bottom, and terminating in a very slender point, through which the heavier fluid alone is permitted to run; or by means of the capillary attraction of a spongy woollen thread, previously soaked with the lighter fluid, for no fluid will enter a substance whose pores are filled by another, for which it has no attraction; and, lastly, upon the same principle, by means of a filter of unsized paper, previously soaked in the heavier fluid, which in this way readily passes through it, while the lighter remains behind.

APPARATUS.

133. Before entering on the chemical operations, it will be necessary to make a few remarks on the instruments employed in performing them. They may be divided into,

a. The vessels in which the effects are performed;

b. Fuel, or the means of producing heat; and

c. The means of applying and regulating the heat; or lamps and furnaces.

VESSELS.

134. The vessels, according to the purposes for which they are intended, vary,
   - *a.* In form; and
   - *b.* In materials.

135. The ingenuity of chemists has been exercised in multiplying the forms of their apparatus, which are often very complex. But the elementary forms are not numerous, although they are not often employed without some modification. They may be divided into,
   - *a.* Solid;
      - 1. Spheroid; shot, ball; often attached as knobs to jars; also the heads of pestles;
      - 2. Cylinder; rod or wire of different diameters and lengths, of all materials, in very frequent use;
      - 3. Cones, of different degrees of acuteness; mullers, conical stoppers;
      - 4. Prisms, with parallel and converging sides;
      - 5. Discs, plates, either circular or prismatic, often used as the covers or forming the bottoms of containing vessels.
   - *b.* Hollow:
      - 1. Spheroidal or globular; seldom used complete and simple, but often in segments, as evaporating dishes, and in combination.
      - 2. Tubular, which may be,
         - *aa.* Straight;
         - *bb.* Bent, as the syphon;
         - *cc.* Sigmoid, as the bent tube.

        The tube may have either both ends open, or one end closed, as in test tubes.
   - *c.* Cylindrical, which is only a wide tube, generally with one end closed by a flat or spherical surface; jars.
   - *d.* Conical, of very various degrees of acuteness, commonly truncated; round crucibles, solution glasses, dishes, pans.
   - *e.* Prismatic; triangular crucibles.

136. The primary combinations of these shapes are,
   - *a.* The spheroido-tubular, the common ballon or receiver, of which the bottom is sometimes plane or indented.
   - *b.* The spheroido-cylindrical, the boiler;
   - *c.* Spheroido-conical, the mattrass;

d. Tubo-cylindrical, or tubo-prismatic, the common medicinal phial, generally furnished with a reflected lip.
e. Tubo-conical, the funnel.
f. Cylindro-conical, the champaigne bottle.

137. No substance possesses properties which render it proper to be employed as a material in every instance. We are therefore obliged to select those substances which possess the properties more especially required in the particular operations for which they are intended.

138. The properties most generally required are,

a. The power of resisting chemical agents. No substance possesses it absolutely: Glass is acted upon by strong caustic ley and fluoric acid; and if it contain much lead it becomes very fusible, and the lead is reduced by great heat. The glazing of common earthen ware is acted upon by acids. Iron is acted upon by most acids and many saline solutions. Copper and brass are dangerous.
b. Transparency, possessed only by glass.
c. Compactness; possessed by metals, glass, and fine porcelain; defective in unglazed and coarse earthen ware, and in wood.
d. Strength; possessed by metals and thick porcelain; defective in glass and soft earthen ware.
e. Incombustibility; possessed by earthen ware and most metals; copper and brass oxidize and scale by heat.
f. Fixity; possessed by all metals, earthen ware and glass.
g. Infusibility; possessed by earthen ware, unless acted upon by chemical agents, green glass, platinum, iron, gold, silver, copper; defective in lead, tin, pewter.
h. And the power of bearing sudden variations of temperature without breaking; defective in metals.

139. The metals in general possess the last six properties in considerable perfection, but they are all opaque. Iron and copper are apt to be corroded by chemical agents, and the use of the latter is often attended with dangerous consequences. These objections are in some measure, but not entirely removed by tinning them. Tin and lead are too fusible. Platinum, gold, and silver, resist most of the chemical agents, but their expense is an insurmountable objection to their general use.

140. Good earthen ware resists the greatest intensity of

heat, but is opaque and deficient in strength. The basis of all kinds of earthen ware is clay, which possesses the valuable quality of being very plastic when wrought with water, and of becoming extremely hard when burnt with an intense heat. But it contracts so much by heat, that it is extremely apt to crack and split, on being exposed to sudden changes of temperature; it is therefore necessary to add some substances which may counteract this property. Siliceous sand, clay burnt with an intense heat, and then reduced to powder, and plumbago, are occasionally used. These additions, however, are attended with other inconveniences; plumbago, especially, is liable to combustion, and sand diminishes the compactness, so that it becomes necessary to glaze most kinds of earthen ware; but the glazes commonly employed are acted upon by chemical agents. The vessels manufactured of Wedgwood's mortar-ware are the best of this description, except those of porcelain, which are very expensive.

141. Glass possesses the three first qualities in an eminent degree, and may be heated red hot without melting. Its greatest imperfection is its disposition to crack, or break in pieces, when suddenly heated or cooled. As this is occasioned by its unequal expansion or contraction, glass vessels should be made very thin, and of a round form. They should also be well annealed, that is, cooled very slowly, by placing them immediately in a heated oven, while they are yet in a soft state after being blown. When ill annealed, or cooled suddenly, glass is apt to fly in pieces on the slightest change of temperature, or touch of a sharp point. We sometimes take advantage of this imperfection; for by means of a red-hot wire, charcoal, or bit of a tobacco pipe, glass-vessels may be cut into any shape. When there is not a crack already in the glass, the point of the wire is applied near the edge, a crack is formed, or the crack may be begun by scratching the surface with a sharp file, which is afterwards easily led in any direction.

142. Reaumur's porcelain is glass, which has been exposed to an intense heat, surrounded with hot sand, and allowed to cool so slowly, that it assumes a crystalline texture, which destroys its transparency, but imparts to it every other quality wished for in chemical vessels. The coarser kinds of glass are commonly used in making it; but as there is no manufacture of this valuable article, its employment is very limited.

LUTES.

143. Lutes are a necessary part of chemical apparatus. They are used for various purposes:

- *a.* For the temporary union of vessels, to prevent the escape of vapour, and exclude air. Lutes.
- *b.* For the permanent union of vessels, and mending fissures. Cements.
- *c.* For protecting glass vessels against the inconvenient effects of heat. Coatings.
- *d.* For lining furnaces.

144. Lutes in general should possess the following properties:

- *a.* Viscidity, plasticity, cohesion, and compactness;
- *b.* The power of resisting acrid vapours;
- *c.* The power of resisting certain degrees of heat.
- *d.* In many cases facility of removal.

These properties are possessed in very different degrees by the several materials commonly used for making lutes, as potter's clay, lime, chalk, linseed meal, flour, wax, oil, paper, linen, tow, bladder, &c.

145. Lutes may be considered as,

- *a.* Unctuous or resinous;
- *b.* Mucilaginous;
- *c.* Earthy.

146. Unctuous lutes possess the two first class of properties in an eminent degree; but they are in general so fusible, that they cannot be employed when they are exposed even to very low degrees of heat, and they will not adhere to any substance that is at all moist. Examples,

- *a.* Eight parts of yellow wax, melted with one of oil of turpentine, with or without the addition of resinous substances, according to the degree of pliability and consistence required. Lavoisier's lute.
- *b.* Four parts of wax, melted with two of varnish * and one of oil. Saussure's lute.
- *c.* Caoutchouc dissolved in melted spermaceti.
- *d.* Mastiche dissolved in the smallest quantity of alcohol, incorporated with a strong spiritous solution of glue, with which some bits of galbanum or gum ammoniac have been triturated.

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* Made by melting yellow amber in an iron laddle, and mixing with linseed oil.

- *e.* Tincture of shell lac mixed with solution of isinglass in proof spirit.
- *f.* Three parts of finely powdered clay, beat into a paste, with one of drying oil [*], or, what is better, amber varnish. Fat lute.
- *g.* Chalk and drying oil, or glazier's putty, is well fitted for luting tubes permanently into glass vessels, for it becomes so hard that it cannot be easily removed.
- *h.* Equal parts of litharge, quicklime, and powdered clay, worked into a paste with oil varnish, is sometimes applied over the cracks in glass vessels, so as to fit them for some purposes.
- *i.* Melted pitch and brick dust.
- *k.* Four parts of rosin melted with one of yellow wax, with one part of fine brick-dust stirred into it.

147. Mucilaginous substances, such as flour, gum, and glue, mixed with water, and albuminous substances, as white of egg, are sufficiently adhesive, are dried by moderate degrees of heat, and are easily removed after the operation, by moistening them with water, but a high temperature destroys them, and they do not resist corrosive vapours. The addition of an insoluble powder is often necessary to give them a sufficient degree of consistency. Examples.

- *a.* Slips of bladder softened in water, and applied with the inside next the vessels. They are apt, however, from their great contraction in drying, to break weak vessels.
- *b.* One part of gum-arabic with six or eight of chalk, formed into a paste with water.
- *c.* Flour worked into a paste with powdered clay or chalk.
- *d.* Almond or linseed meal formed into a paste with mucilage or water.
- *e.* Quicklime in fine powder, hastily mixed with white of egg, and instantly applied, sets very quickly, but becomes so hard that it can scarcely be removed.
- *f.* Slaked lime in fine powder, with glue, does not set so quickly as the former.
- *g.* The cracks of glass vessels may be cemented by daubing them and a suitable piece of linen with white of egg, strewing both over with finely powdered quicklime, and instantly applying the linen closely and evenly.

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[*] Drying oil is prepared by boiling 22.5 parts of litharge in 16 of linseed oil until it be dissolved.

148. Earthy lutes resist very high temperatures, but they become so hard that they can scarcely be removed, and often harden so quickly after they are mixed up, that they must be applied immediately. Examples.

- *a.* Quicklime well incorporated with a sixth part of muriate of soda, applied on slips of linen.
- *b.* Burnt gypsum, made up with water, sets quickly.
- *c.* One ounce of borax dissolved in a pound of boiling water, mixed with a sufficient quantity of powdered clay. Mr Watt's fire lute.
- *d.* One part of clay with four of sand, formed into a paste with water. This is also used for coating glass vessels, in order to render them stronger, and capable of resisting intense heat. It is then made into a very thin mass mixed with chopt hair, and applied in successive layers, taking care that each coat be perfectly dry before another be laid on.
- *e.* Six parts of clay, with one of iron-filings, made into a paste with oil.

149. The lutes for lining furnaces will be described when treating of furnaces.

150. In the selection of lutes, attention must be paid to the chemical nature of the vapour to be confined.

- *a.* Aqueous vapour is confined by resinous, waxy, and oily lutes, but not by lutes whose viscidity depends on mucilage, or other substances soluble in water.
- *b.* For the vapour of alcohol, ether, and the volatile and empyreumatic oils, the mucilaginous and earthy lutes are fit; the resinous unfit.
- *c.* For acid vapours, the resinous, waxy and oily are fit; the earthy unfit.
- *d.* For ammoniacal vapour, the earthy are fit; organic matter unfit.

151. The junctures of vessels which are to be luted to each other should previously be accurately and firmly fitted, by introducing between them, when necessary, short pieces of wood or cork, or, if the disproportion be very great, by means of a cork fitted to the one vessel, having a circular hole bored through it, through which the neck of the other vessel or tube may pass, or by wrapping wet tow around it.

152. After being thus fitted, the lute is either applied very thin, by spreading it on slips of linen or paper, and securing it with thread; or if it is a paste lute, it is formed into small cylinders, which are successively applied to the junctures, taking care that each piece be made to adhere firmly and per-

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fectly close in every part before another is put on. Lastly, the whole is secured by slips of linen or bladder.

153. In many cases, to permit the escape of elastic vapours, a small hole is made through the lute with a pin, or the lute is perforated by a small quill, fitted with a stopper.

154. There are other modes of rendering the junctures of vessels tight, besides covering them with lute. On many occasions this is effected by grinding the neck of the one into that of the other, and also very frequently by immersing the mouth or orifice into water or mercury, the column of which must be overcome before any communication can take place between the contents of the vessels and the atmosphere.

HEAT AND FUEL.

155. As caloric is an agent of the most extensive utility in the chemical operations of pharmacy, it is necessary that we should be acquainted with the means of employing it in the most economical and efficient manner.

156. The rays of the sun are used in the drying of many vegetable substances; and the only attentions necessary are to expose as large a surface as possible, to allow the vapour to escape readily, and to turn them frequently, that every part may be dried alike. They are also sometimes used for promoting spontaneous evaporation.

157. Combustion is a much more powerful and certain source of heat. Alcohol, oil, tallow, wood, turf, coal, charcoal, and coke, are all occasionally employed.

158. The combustion of fuel is the common source of heat for pharmaceutical purposes.

159. Fuel is either,

a. Gaseous,—hydrogen and carburetted hydrogen.
b. Fluid.
  aa. Volatile without decomposition, alcohol, naphtha, volatile oil.
  bb. Fixed,—vegetable oil, fish oil.
c. Solid.
  aa. Fusible,—spermaceti, wax, tallow.
  bb infusible, inflammable, wood, turf, coal.
  ——— uninflammable, charred wood, turf, coal.

160. The combustible principles in all these fuels is hydrogen and carbon. When they contain little hydrogen, they burn without flame or smoke, becoming merely incandescent, as charcoal, coke, blind coal. For the production of flame, the fuel must be in the state of gas or vapour, and smoke and soot are owing to the imperfect combustion of carbonaceous particles.

161. Hydrogen gas burns with a blue flame, giving out little light, but a very intense heat, especially if burnt with oxygen, as in Newmann's blowpipe.

162. Carburetted hydrogen, whether the lighter variety, coal gas, or the heavier variety, oil gas, are now in common use for the production of heat and light, the former yielding proportionally more heat, the latter more light.

163. It has not been as yet ascertained what is the most advantageous method of burning gas as a source of heat. But from some experiments made by myself, the heat generated seemed to be the same, whether it was burnt in the usual method, or upon a wire-gauze burner, after being mixed with atmospheric air. At any rate, in the latter method, the heat was more diffused.

164. As a fuel, gas possesses some peculiar advantages, especially for processes on a small scale.

- *a.* It may be conveyed to any situation by means of pipes.
- *b.* It may be continued any length of time very steadily, at any degree between its *minimum* and *maximum.*

165. Its defects are,

- *a.* Want of intensity for certain purposes, or rather of quantity for operations on a considerable scale.
- *b.* Its being too much concentrated, so that vessels of some size exposed to it are very unequally heated. This inconvenience may in some measure be remedied by using a number of single jets, or burning upon a wire-gauze burner.

166. Fluid combustibles, such as alcohol, naphtha, oil, and melted wax, spermaceti, and tallow, can only be burnt on porous wicks, which draw up a portion of the fluid to be volatilized and inflamed. Fluid inflammables are therefore burnt in lamps of various constructions, and solid but fusible inflammables may be made into candles. But although commonly used to produce light, they also afford an uniform, but not high temperature. This may however be increased by increasing the number and size of the wicks. Alcohol and naphtha produce a steady heat, no soot, and, if strong, leave no residuum. Oil gives a higher temperature, but on a common wick produces much smoke and soot. These are diminished, and the light and heat increased, by making the surface of the flame bear a large proportion to the centre; which is best done by a cylindrical wick, so con-

trived that the air has free access both to the outside and inside of the cylinder, as in Argand's lamp, invented by Mr Bolton of Birmingham. In this way, oil may be made to produce a considerable temperature, of great uniformity, and without the inconvenience of smoke.

167. Wicks have the inconvenience of being charred by the high temperature to which they are subjected, and becoming so clogged as to prevent the fluid from rising in them. They must then be trimmed; but this is seldomer necessary with alcohol and fine oils than with the coarser oils. Incombustible wicks, made of asbestus or spun glass, have been lately introduced for alcohol or naphtha. Lamps are also improved by adding a chimney to them. It must admit the free access of air to the flame, and then it increases the current, confines the heat, and steadies the flame. The intensity of the temperature of flame may be greatly increased by forcing a small current of hot air through it, as by the blowpipe.

168. Wood, turf, coal, charcoal, and coke, solid combustibles, are burnt in grates and furnaces.

169. Wood has the advantage of kindling readily, but affords a very unsteady temperature, is inconvenient from its flame, smoke, and soot, and requires much attendance. The heavy and dense woods give the greatest heat, burn longest, and leave a dense charcoal.

170. Dry turf gives a steady heat, and does not require so much attention as wood; but it consumes fast, its smoke is copious and penetrating, and the empyreumatic smell which it imparts to every thing with which it comes in contact, adheres to them with great obstinacy. The heavy turf of marshes is preferable to the light surface turf.

171. Coal is the fuel most commonly used in this country. Its heat is considerable, and sufficiently permanent, but most kinds of it produce much flame and smoke.

172. Charcoal, especially of the dense woods, is a very convenient and excellent fuel. It burns without flame or smoke, and gives a strong, uniform, and permanent heat, which may be easily regulated, especially when it is not in too large pieces, and is a little damp. But it is costly, and burns quickly.

173. Coke, or charred coal, possesses similar properties with charcoal; it is less easily kindled, but is capable of producing a higher temperature, and burns more slowly.

174. An open grate will serve for many pharmaceutical operations. Digestion may be performed on the hod of a

Bath stove, and decoction over an open fire, but this should be furnished with cranes or trivets to support the vessels, that they may not be overturned by the burning away of the fuel. Hot closets and boilers are easily and often attached to open grates.

175. For small operations and experiments, gas burners, and spirit, oil or tallow lamps will serve. The chauffer with parallel sides, which is in fact the body of a furnace, is very convenient on many occasions, and its power may be greatly increased by covering it with a dome and chimney.

FURNACES.

176. In all furnaces, the principal objects are, to produce a sufficient degree of heat, with little consumption of fuel, and to be able to regulate the degree of heat.

177. An unnecessary waste of fuel is prevented by forming the sides of the furnace of very imperfect conductors of caloric, and by constructing it so that the subject operated on may be exposed to the full action of the fire.

178. The degree of heat is regulated by the quantity of air which comes in contact with the burning fuel. The quantity of air is in the compound ratio of the size of the aperture through which it enters, and its velocity. The velocity may be increased by mechanical means, as by bellows, or by increasing the height and width of the chimney.

179. The essential parts of a furnace are,

a. A body for the fuel to burn in;
b. A grate for it to burn upon;
c. An ash-pit to admit air and receive the ashes;
d. A chimney for carrying off the smoke and vapours.

180. The ash-pit should be perfectly close, except the door, which should be furnished with a register-plate, to regulate the quantity of air admitted.

181. The bars of the grate should be square or triangular, and placed with an angle pointed downwards, and not above half an inch distant. The grate should be fixed on the outside of the body.

182. The body may be cylindrical or elliptical, with apertures for introducing the fuel and the subjects of the operation, and for conveying away the smoke and vapours.

183. The forms of furnaces have been infinitely varied, either by the caprice of chemists, or to adapt them to certain specific purposes, or to suit them to many purposes, which generally injures them for all.

a. When the combustion is supported by the current of air naturally excited by the burning of the fuel, it is called a wind furnace;

b. When it is accelerated by increasing the velocity of the current by bellows, it forms a blast-furnace;

c. When the body of the furnace is covered with a dome, which terminates in the chimney, it constitutes a reverberatory furnace.

184. Furnaces are either fixed, and built of fire-brick, or are portable, and fabricated of plumbago, earthen ware, plate-iron. When of iron, they must be lined with some badly conducting and refractory substance, both to prevent the dissipation of heat, and to defend the iron against the action of the fire. Dr Black employed two different coatings. Next to the iron, he applied a composition of three parts by weight of charcoal, and one of fine clay, first mixed in the state of fine powder, and then worked up with as much water as permitted the mass to be formed into balls, which were applied to the sides of the furnace, and beat very firm and compact with the face of a broad hammer, to the thickness of about one inch and a half in general, but so as to give an elliptical form to the cavity. Over this, another lute, composed of six or seven parts of sand, and one of clay, was applied, in the same manner, to the thickness of about half an inch. These lutes must be allowed to become perfectly dry before the furnace is heated, which should at first be done gradually. A mixture of scales of iron and powdered tiles, worked up with blood, hair, and clay, is much recommended; and Professor Hagen says, that it is less apt to split and crack when exposed at once to a violent heat than when dried gradually, according to the common directions. They may also be lined with fire bricks of a proper form, accurately fitted and well-cemented together before the top-plate is screwed on.

185. The general fault of furnaces is, that they admit too much air, which prevent us from regulating the temperature. The fire either becomes too violent and unmanageable, or, when more cold air is admitted than what is necessary for supporting the combustion, the heat is carried off, and the temperature cannot be raised sufficiently. The superior merit of Dr Black's furnace consists in the facility with which the admission of air is regulated; and every attempt hitherto made to improve it, by increasing the number of its apertures, have in reality injured it.

186. Heat may be applied to vessels employed in chemical operations,

- *a.* Directly, as in the open fire and reverberatory furnace;
- *b.* Or through the medium of sand; the sand-bath;
- *c.* Of water; the water-bath;
- *d.* Of steam; the vapour-bath; steam apparatus;
- *e.* Of air; as in the muffle; hot closet.

CHEMICAL OPERATIONS.

187. Although, in all chemical operations, combination takes place, and there are very few of them in which decomposition does not also occur; yet, for the sake of method, we shall consider them as principally intended to produce,

- *a.* Change in the form of aggregation *;
- *b.* Combination;
- *c.* Decomposition.

188. The form of aggregation may be altered by,

- *a.* Fusion;
- *b.* Vaporization;
- *c.* Condensation;
- *d.* Congelation;
- *e.* Coagulation.

189. *Liquefaction* is commonly used to express the melting of substances, as tallow, wax, resin, &c. which pass through intermediate states of softness before they become fluid. It is employed in the preparation of most of the plasters and ointments.

190. *Fusion* is the melting of substances which pass immediately from the solid to the fluid state, as many salts and most of the metals. Substances differ very much in fusibility; some, as water and mercury, existing as fluids in the ordinary temperatures of the atmosphere; while others, as the pure earths, are scarcely fusible. Fusion is exemplified in sulphur, acetate of potass, alum, and various metallic preparations.

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* The change of the form of aggregation is commonly preceded by expansion or contraction. Bodies differ very much in the degree of gradual expansion, which equal increments of temperature produce in them. Gases and vapours are more expansible than fluids, fluids than solids. The individuals of the two last forms of aggregation also exhibit considerable differences. All gases and vapours expand alike.

191. When a substance acquires by fusion a degree of transparency, a dense uniform texture, and great brittleness, and exhibits a conchoidal fracture, with a specular surface, and the edges of the fragments very sharp, it is said to be *vitrified.* Example, Glass of antimony.

192. During fusion and vaporization, caloric is imparted to the body melted or vaporized; and as the temperature is not increased at the same time, the caloric is said to become *latent.* During condensation and evaporation, caloric is abstracted or evolved, and becomes *sensible.*

193. These changes take place at certain determinate degrees of temperature *, which are called the freezing or melting points, or boiling points, of each substance. Of these, tables are inserted in the Appendix.

194. In general, simple substances are less fusible than compounds; thus, the simple earths cannot be melted singly, but when mixed are easily fused. Metallic mixtures melt more readily than the simple metals, not only than the mean of the whole, but sometimes than the most fusible. On this depends the utility of solders.

195. The additions which are sometimes made to refractory substances to promote their fusion, are termed *fluxes.*

196. These fluxes are generally saline bodies.

a. The alkalies, potass, and soda, promote powerfully the fusion of siliceous stones; but they are only used for accurate experiments.

The *white flux* is a mixture of a little potass with carbonate of potass, and is prepared by deflagrating together equal parts of nitrate of potass and supertartrate of potass.

When an oxide is at the same time to be reduced, the *black* flux is to be preferred, which is produced by the deflagration of two parts of supertartrate of potass and one of nitrate of potass. It differs from the former only in containing a little charcoal.

Soap promotes fusion by being converted by the fire into carbonate of soda and charcoal.

b. Aluminous stones have their fusion greatly promoted by the addition of sub-borate of soda.

c. Muriate of soda, the mixed phosphate of soda and ammonia, and other salts, are also occasionally employed.

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* *Temperature* is that state of any body, by which it excites the sensation of heat or of cold, and produces the other effects which depend on the excess or deficiency of caloric.

197. The vessels in which fusion is performed, must resist the heat necessary for the operation. In many pharmaceutical purposes, an open fire is sufficient; and an iron or copper ladle or pot may be used.

198. In other cases, the heat of a furnace is required, and the fusion is performed in crucibles.

199. *Crucibles* are of various sizes, forms and materials.

200. The large crucibles are generally conical, with a small spout for the convenience of pouring out: the small ones are truncated triangular pyramids, and are commonly sold in nests.

201. The Hessian crucibles are composed of clay and sand, and when good will support an intense heat many hours, without softening or melting; but they are disposed to crack when suddenly heated or cooled. This inconvenience may be on many occasions avoided, by using a double crucible, and filling up the interstice with sand, or by covering the crucible with a lute of clay and sand, by which means the heat is transmitted more gradually and equally. Those which give a clear sound when struck, and are of an uniform thickness, and have a reddish-brown colour, without black spots, are reckoned the best.

202. Wedgwood's crucibles are made of clay mixed with baked clay finely pounded, and are in every respect superior to the Hessian, but they are expensive.

203. The black lead crucibles, formed of clay and plumbago, are very durable, resist sudden changes of temperature, and may be repeatedly used; but they are destroyed when saline substances are melted in them, and suffer combustion when exposed red-hot to a current of air.

204. When placed in a furnace, crucibles should never be set upon the bars of the grate, but always upon a support. Dr Kennedy found the hottest part of a furnace to be about an inch above the grate. They may be covered, to prevent the fuel or ashes from falling into them, with a lid of the same materials, or with another crucible inverted over them.

205. When the fusion is completed, the substance may be either permitted to cool in the crucible, or poured out upon a slab, or into a heated mould anointed with tallow, never with oil, or, what is still better, covered with a thin coating of chalk, which is applied by laying it over with a mixture of chalk diffused in water, and then evaporating the water completely by heat. To prevent the crucible from being broken by cooling too rapidly, it should be either replaced in

the furnace, to cool gradually with it, or covered with some vessel, to prevent its being exposed immediately to the air.

206. Fusion is performed with the intentions,

a. Of weakening the attraction of aggregation,
  1. To facilitate mechanical division, as in the granulation of tin or phosphorus;
  2. To produce mechanical union, as in soldering;
  3. To promote chemical action, as in forming plasters, alloys, running glazes, and combining sulphur and metals.

b. Of separating from each other substances of different degrees of fusibility, as metals from their scoriæ.

207. *Vaporization*, in its most general sense, is the conversion of a solid or fluid into vapour by the agency of caloric, whether accompanied by decomposition or not.

208. Some solids, unless subjected to very great pressure, are at once converted into vapour, although most of them pass through the intermediate state of fluidity.

209. Vaporization is employed,

a. To separate substances differing in volatility.

b. To promote chemical action, by disaggregating them.

210. When employed with either of these views, either

a. No regard is paid to the substances volatilized,
  1. From fluids, as in evaporization;
  2. From solids, as in ustulation and charring;

b. Or the substances vaporized are condensed in proper vessels,
  1. In a liquid form, as in distillation;
  2. In a solid form, as in sublimation;

c. Or the substances disengaged are permanently elastic, and are collected in their gaseous form, in a pneumatic apparatus.

211. Vaporability is merely a relative term, and from analogy it may be concluded that all bodies may be converted into vapour at a very high temperature, and *vice versa*, that all gases may be condensed by very great abstraction of caloric.

212. Substances are however said to be permanently elastic, when they exist in the form of air at ordinary temperatures; to be vaporizable, when they can be converted into the form of an elastic fluid at an increased temperature; to be volatile, when a slight increase is sufficient for the purpose; and to be fixed, when it requires a great increase, or cannot be effected.

213. *Vaporization* is much retarded by increase of pressure, and facilitated by its diminution, insomuch, that some

substances which, under the ordinary pressure of the atmosphere, seem to pass at once from the state of solid to that of vapour, may, by the application of sufficient pressure, be made to assume the intermediate state of fluidity; while, on the contrary, all fluids which have been hitherto tried, begin in a vacuum to boil and to emit vapour, when their temperature is lower, by 120° at least, than their vaporific point, at the ordinary pressure of the atmosphere.

214. *Evaporation* is the conversion into steam of any liquid, whether it be pure or nearly so, or contain in solution any substance, as salts or vegetable matters. There is no formation of any new substance; and when the evaporated fluid contains any substance in solution, it is merely the solvent, or a part of it, that is removed, and the dissolved matter remains either solid or in concentrated solution.

215. *Spontaneous evaporation* is when, without the application of heat, it takes place quietly, with an imperceptible waste of the fluid evaporated. It is most commonly observed when a large surface is exposed to the action of the atmosphere; and it was formerly supposed to be a mere solution of vapour in the air. But that this is not the case, appears from spontaneous evaporation taking place more rapidly when the air is removed, as under the exhausted receiver of an air pump. The acceleration of spontaneous evaporation by a current of air blowing over the surface of a fluid, is owing to the removal of the vapour lying on its surface, which, by its pressure, prevents the formation of more.

216. *Ebullition* is when, in consequence of the application of heat, evaporation is rapidly performed, with the formation of bubbles of vapour which pass through the fluid, and burst on its surface. Of some viscid fluids the bubbles do not burst rapidly, but accumulate and boil over the vessel; to prevent which, it is necessary sometimes to pour a little oil on the surface, or to break the bubbles by stirring. When vapour is rapidly formed at the bottom of the fluid before the whole has been heated to the boiling point, violent succussions take place, in consequence of its rapid condensation, as it rises in the colder fluid. This is prevented by inserting a coil of metallic wire in the fluid, to be evaporated by ebullition.

217. It is performed in open, shallow, or hemispherical vessels of silver, tinned copper or iron, earthen-ware or glass. The necessary caloric may be furnished by means of an open fire, a lamp or a furnace, and applied either directly, or by the intervention of sand, water, or vapour. The

degree of heat must be regulated by the nature of the substance operated on. In general, it should not be greater than what is absolutely necessary. It is promoted by reduction of atmospheric pressure, and removal of the steam as it is formed.

218. Evaporation may be,

a. Partial:

1. From saline fluids, Concentration;
2. From viscid fluids, Inspissation.

b. Total, Exsiccation.

219. *Concentration* is employed,

a. To lessen the quantity of diluting fluids; as in sulphuric acid and saline fluids in general.

b. As a preliminary step to crystallization; as in the manufacture of sea salt.

220. *Inspissation* is almost confined to animal and vegetable substances; and as these are apt to be partially decomposed by heat, or to become empyreumatic, the process should always be performed, especially towards the end, in a water or vapour bath.

221. *Exsiccation* is the total expulsion of moisture from any body by means of caloris. The exsiccation of compound oxides should always be performed in the water bath.

222. Exsiccation may be also performed without increased temperature, by confining the substance to be dried under a vessel, or, what is more powerful, under an exhausted receiver, along with a substance having a strong affinity for water, as sulphuric acid, lime, &c.

223. Exsiccation is performed on saline bodies, to render them more acrid or pulverulent, or to prepare them for chemical operations. Animal and vegetable substances are exsiccated to give them a solid form, and to prevent their fermentation.

224. Salts are deprived of their water of crystallization by exposing them to the action of heat in a glass vessel or iron ladle. Sometimes they first dissolve in their water of crystallization (or undergo what is called the *watery fusion,)* and are afterwards converted into a dry mass by its total expulsion; as in the calcination of borax, or burning, so called, of alum.

225. The sudden exsiccation of some salts is attended with a crackling noise, and splitting of the salt, as in muriate of soda, which is termed *decrepitation*, and is performed by throwing into a heated iron vessel, small quantities of

the salt at a time, covering it up, and waiting until the decrepitation be over, before a fresh quantity is thrown in.

226. *Ustulation* is almost entirely a metallurgic operation, and is employed to expel the sulphur and arsenic contained in some metallic ores. The reverberatory furnace is commonly employed for roasting, and the heat is at first very gentle, and slowly raised to redness. The process is accelerated by exposing as large a surface of the substance to be roasted as possible, and by stirring it frequently, so as to prevent any agglutination, and to bring every part in succession to the surface. It is performed on small quantities in tests placed within a muffle. Tests are shallow vessels made of bone ashes, or baked clay. Muffles are vessels of baked clay, of a semi-cylindrical form, the flat side forming the floor, and the arched portion the roof and sides. The end and sides are perforated with holes for the free transmission of the heated air, and the open extremity is placed at the door of the furnace, for the inspection and manipulation of the process.

227. *Charring* may be performed on any of the compound oxides, animal or vegetable, by subjecting them to a degree of heat sufficient to expel all their hydrogen, nitrogen, and oxygen, while the carbon, being a fixed principle, partly remains behind in the state of charcoal. The temperature above 212 necessary for the operation, may be produced either by the combustion of other substances, or by the partial combustion of the substance to be charred. In the former case, the operation may be performed in any vessel which excludes the air while it permits the escape of the gases or vapours formed. In the latter, the access of air must be regulated in such a manner, that it may be suppressed whenever the combustion has reached the requisite degree; for if continued to be admitted, the charcoal itself would be dissipated in the form of carbonic acid gas, and nothing would remain but the alkaline and earthy matter, which these substances always contain. When combustion is carried this length, the process is termed *Incineration.* The vapours which arise in the operation of charring are sometimes condensed, as in the manufacture of tar. Charcoal is sometimes obtained as a bye product in other processes, as in the distillation of tar and pyrolignic acid.

228. *Condensation* is the reverse of expansion, and is produced either,

a. Gradually, by mechanical pressure forcing out the caloric in a sensible form, as water is squeezed out of a sponge; or, *b.* Suddenly, by the chemical abstraction of caloric, which is followed by an approximation of the particles of the substance.

229. Gradual condensation is rarely attended by any change in the form of aggregation, but generally consists in a mere diminution of volume or in contraction.

230. It may, however, be performed so rapidly, as to be attended with an obvious disengagement of heat and light; as in the inflammation of tinder in the compressing syringe.

231. Many of the gases hitherto considered as permanently elastic have also been condensed into a fluid form by Mr Faraday, by the compression excited by their own vapour highly expanded by heat.

232. Compression is used occasionally to promote chemical action, and to favour the union of gaseous bodies with each other or with fluids; as when we compress carbonic acid into water or alkaline solutions.

233. Sudden condensation only occurs when substances naturally liquid or solid have been converted into the state of vapour, by heat or reduction of pressure, or by other adventitious circumstances, and takes place whenever these circumstances are removed. It is therefore always preceded by vaporization, and comprehends those operations in which the substances vaporized are condensed in proper vessels. When the product is a fluid, it is termed distillation; when solid, sublimation.

234. *Distillation* is said to be performed,

a. Via humida, when a fluid is subjected to the operation;

b. Via sicca, when solids are subjected to the operation, and the fluid product arises from decomposition, and a new arrangement of the constituent elements.

235. The distinction seems sufficiently obvious; yet there are cases of which it is doubtful to which of them they belong. *Via humida* we distil water, aromatic waters, volatile oils, spirits, ethers, *aqua ammoniæ* by the old process, ammoniated spirits, distilled vinegar. *Via sicca* we distil empyreumatic oils, spirit of hartshorn, pyrolignic acid, mineral acids, chlorine.

236. The objects of distillation are,

a. To separate more volatile fluids from less volatile fluids or solids; as spirit from water, ether from spirit, volatile oil from vegetables.

b. To promote the union of different substances; as water or spirit with volatile oils.

c. To generate new products by the action of fire; formation of ether, all distillations *via sicca.*

237. In all distillations the heat applied should not be greater than what is necessary for the formation of the vapour, and even to this degree it should be gradually raised. The vessels also in which the distillation is performed should never be filled above one-half, and sometimes not above one-fourth, lest the substance contained in them should boil over.

238. In distillation we have to consider

a. The apparatus;

b. The management of the heat.

239. As distillation is a combination of evaporation and condensation, the apparatus consists of two principal parts;

a. The vessels in which the vapours are formed;

b. The vessels in which they are condensed.

240. The vessels employed for both purposes are variously shaped, according to the manner in which the operation is conducted. The first difference depends on the direction of the vapour after its formation. It either

a. Descends; distillation *per descensum;*

b. Ascends; distillation *per ascensum;*

c. Or passes off by the side; distillation *ad latus.*

241. Distillation *per descensum* is obsolete as a pharmaceutic process, but is used in the arts when the vapour is very heavy and cannot be made to ascend. The matter to be distilled is supported over the condensing chamber or vessel, and the heat is applied around and above the matter to be distilled. In this way volatile metals, as mercury and zinc, are distilled from their ores. Organic substances are also treated in this way; but the product is of a mixed nature, as in the manufacture of tar, which is a mixture of empyreumatic oil and pyrolignic acid, distilled products, with melted rosin.

242. On a small scale, a perforated plate, generally of tinned iron, is fixed within any convenient vessel, so as to leave a space beneath it. The subject of the operation is laid on this plate, and is covered by another, accurately fitting the vessel, and sufficiently strong to support the fuel which is burnt upon it. Thus the heat is applied from above, and the vapour is forced to descend into the inferior cavity, where it is condensed. In this way the oil of cloves was said to be prepared. But it is evident that the application of the heat was very uneconomical.

243. Distillation *per ascensum* and *ad làtus* are but modifications of each other. In the former, the vapour is made to ascend into an upper vessel, and is there condensed. In the latter, the vapour, after ascending a little way, is carried off laterally before it is condensed. But in the distillation *per ascensum*, there is always a lateral condensing apparatus, as the whole vapour can scarcely be condensed in the upper vessel.

244. The purest example of distillation *per ascensum* is where the cucurbit and alembic are used, or the apparatus called the cold still, the Mohrenkopfe of the Germans.

245. The vessel most commonly employed for the distillation of waters and spirits is the common copper-still, which consists of a body for containing the materials, and a head into which the vapour ascends. From the middle of the head a tube arises a short way, and is then reflected downwards, through which the steam passes to be condensed.

246. Another kind of head, rising to a great height before it is reflected, is sometimes used for separating fluids, which differ little in volatility, as it was supposed that the less volatile vapours would be condensed, and fall back into the still, while only the more volatile vapours would arise to the top, so as to pass to the refrigeratory. The same object may be more conveniently and economically attained by managing the fire with caution and address.

247. The greater the surface exposed, and the less the height the vapours have to ascend, the more rapidly does the distillation proceed; and so well are these principles understood by the Scotch distillers, that they do not take more than three minutes to discharge a still containing 50 gallons of fluid.

248. The condensing apparatus used with the common still is very simple. The tube in which the head terminates is inserted into the upper end of a pipe, which is kept cool by passing through a vessel filled with water, called the Refrigeratory. This pipe is commonly made of a serpentine form; but as this renders it difficult to be cleaned, Dr Black recommends a sigmoid pipe. The refrigeratory may be furnished with a stop-cock, that when the water it contains becomes too hot, and does not condense all the vapour produced, it may be changed for cold water.

249. A very convenient condensing apparatus, now much used, is a long straight pipe, which is surrounded by another tube considerably wider, which acts as a Refrigeratory, by a stream of water being made to pass through it, entering cold

at the remote or lower end, and issuing heated at the upper or near end. In all cases, the product of the distillation drops from the lower end of the pipe into the vessel destined to receive it; and we may observe, that when any vapour issues along with it, we should either diminish the power of the fire, or change the water in the refrigeratory.

250. *Circulation* was a process formerly in use. It is a distillation *per ascensum*, and consisted in arranging the apparatus so, that the vapours were no sooner condensed into a fluid form, than this fluid returned back into the distilling vessels, to be again vaporized; and was effected by distilling in a glass vessel, with so long a neck that the vapours were condensed before they escaped at the upper extremity, or by inverting one matrass within another.

251. The distillation *ad latus* is performed in a retort, or pear-shaped vessel, having the neck bent to one side. The body of a good retort is well rounded, uniform in its appearance, with a thin bottom, and of an equal thickness, and the neck is sufficiently bent to allow the vapours, when condensed, to run freely away, but not so much as to render the application of the receiver inconvenient, or to bring it too near the furnace. The passage from the body to the neck must be perfectly free and sufficiently wide, otherwise the vapours produced in the retort circulate long in its body, without passing over into the receiver.

252. The condensing apparatus used with the retort is commonly a receiver. These are of many shapes,

a. Simple, which may be either a ballon or a bottle;

b. Tubulated, having a tubulature, which may be either closed with a stopper, or connected with other apparatus by a bent tube;

c. Spout, having a spout issuing from the lower side, by which means the product of different periods of the process may be kept separate.

d. Compound, consisting of a series of receivers, as the aludels of the old chemists, or those used now in the distillation of nitric and muriatic acid; or of a series of bottles, connected by tubes, as in Woulfe's apparatus.

253. The variety of forms given to Woulfe's apparatus is now very great. It essentially consists of a tubulated retort, adapted to a tubulated receiver. With the tubulature of the receiver a three-necked bottle is connected by means of a bent tube, the further extremity of which is immersed, one or more inches, in some fluid contained in the bottle.

A series of two or three similar bottles are connected with this first bottle in the same way. In the middle tubulature of each bottle, a glass tube is fixed, having its lower extremity immersed about a quarter of an inch in the fluid. The height of the tube above the surface of the fluid must be greater than the sum of the columns of fluid standing over the farther extremities of the connecting tubes, in all the bottles or vessels more remote from the retort. Tubes so adjusted are termed Tubes of safety, for they prevent that reflux of fluid from the more remote into the nearer bottles, and into the receiver itself, which would otherwise inevitably happen, on any condensation of vapour taking place in the retort, receiver, or nearer bottles. The further tubulature of the last bottle is commonly connected with a pneumatic apparatus, by means of a bent tube. When the whole is properly adjusted, air blown into the retort should pass through the receiver, rise in bubbles through the fluids contained in each of the bottles, and at last escape by the bent tube. In the receiver, those products of distillation are collected, which are condensable by cold alone. The first bottle is commonly filled with water, and the others with alkaline solutions, or other active fluids; and as the permanently elastic fluids produced are successively subjected to the action of all these, only those gases will escape by the bent tube which are not absorbable by any of them.

254. *Connection and adjustment of parts.*—In the common still, the tube of the head is fitted into the condensing tube, or screwed to it by a joining screw, and it is rare that any lute is necessary. As the remote orifice is left open, all the joinings may be air tight.

255. When a simple retort and receiver are used, the neck of the retort should reach into the body of the receiver. A lute will be necessary to close the juncture, even if their necks be adapted by grinding.

256. A double conical tube of glass or earthen-ware, called an Adopter, is always advantageously interposed between the retort and receiver, receiving the neck of the former, and entering into the body of the latter. The joining of the adopter and receiver must be accurately luted; that between the retort and adopter may be left without lute, as it soon gets closed by a little condensed vapour, and it acts as a safety valve, only giving way when the internal pressure would endanger the bursting of the apparatus.

257. It is never advisable to have a retort and receiver made perfectly air-tight; because, the air in the vessel by its

expansion when heated, causes great pressure on the surface of the distilling fluid, and thus retards the process. There is also much danger either of the lute giving way, or the vessels themselves bursting from the expansion of the contained air. If permanently elastic fluids be extricated during the process, one of these consequences is inevitable. In such cases it is necessary to provide a way by which these gases may escape. We are commonly directed to pierce a hole through the lute, or to insert a piece of quill or glass tube between the necks of the retort and receiver communicating with the body of the latter, but this renders the fitting difficult, and is otherwise inconvenient. It is much better to use a tubulated receiver, and to connect the tube with a Woulfe's apparatus, or merely to insert it into a cup with mercury, which will act as a safety valve, allowing gas or excess of vapour easily to escape, while by its play in the tube the mercury prevents any unequal ebullition of the fluid in the retort. By elongating the tube to 30 inches, I have been enabled to use it as an apparatus for distilling *in vacuo*.

258. The materials to be operated upon are, in many instances, put into the body of the still, or introduced into the body of the retort before the condensing apparatus is connected with it; in other instances, not until after the connection is made.

259. In the former case, there is no difficulty with the common still pot; but with the simple retort, a funnel, with a long tube, either straight or bent at right angles, called a Retort funnel, is necessary, to prevent the neck of the retort being soiled by the fluid to be poured in.

260. When the apparatus is previously mounted, fluids may be poured into the body of the still by a funnel-mouthed tube reaching nearly to the bottom, through which fluid may be poured in, but vapour cannot escape. The same end is obtained in retorts by a long-tubed funnel introduced through a cork fitted in the tubulature, by which contrivance I have prepared large quantities of nitric ether with perfect ease and safety; or a funnel with a double bent tube (Walter's tube of safety) may be adapted to the tubulature.

261. From the common still the residuum of the process may be drawn off by a stop-cock, without dismounting the apparatus; from a retort it can only be done by a syphon or long-tubed syringe.

262. The body of the still or retort should never be filled

above one-half, sometimes not above one-fourth, to prevent the possibility of boiling or spirting over.

263. The modes of applying heat have been already noticed under evaporation, but its management varies according to the nature of the process.

264. When the liquid to be distilled over already exists in the material distilled, and especially when it is to be dissolved out of a solid by the action of a volatile menstruum, as in the distilled waters and spirits, the heat should be gradually raised, that the action may be complete, and that no volatile matter be forced over unimpregnated.

265. When, however, a volatile fluid is to have its nature changed by the chemical action of another substance, as in the formation of ether, the heat must be raised quickly, as otherwise part of the spirit will rise unchanged, not etherified.

266. Means must also be used to prevent the receiver from being heated by the caloric evolved during the condensation of the vapours. It may either be immersed in cold water, or covered with snow or pounded ice; or a constant evaporation may be supported from its surface, by covering it with a cloth, kept moist by means of the descent of water, from a vessel placed above it, through minute syphons or spongy worsted threads. But as, during the process of distillation, permanently elastic fluids are often produced, which would endanger the breaking of the vessels, these are permitted to escape, either through a tubulature, or hole in the side of the receiver, or rather through a hole made in the luting.

267. In most apparatuses for distillation, considerable waste of heat and time is sustained by a portion of the vapour being condensed in the upper part of the still or retort, and running back into its body, to be distilled over and over again. Therefore this part of the apparatus should never be cooled, as is often done, but kept hot, that as little vapour as possible be condensed, until it reaches the condenser.

268. During the condensation of vapour, there is necessarily a great deal of heat communicated to surrounding bodies, first to the vessel, and from it to substances in contact with it. This heat may be economically used,

1. To heat water, in which the condenser is commonly immersed.
2. To heat the next charge of the still.

3. To distil at the same time another more volatile fluid.

4. To distil the same fluid under diminished pressure.

269. Distillation is greatly facilitated, and performed at a much reduced temperature, by removing or counteracting causes impeding the formation of vapour. These are,

a. The pressure of the atmosphere.

b. The pressure of the vapour already formed.

270. The pressure of the vapour is removed by condensing it as quickly and as completely as possible.

271. Many contrivances have been used for taking off the pressure of the atmosphere on distilling *in vacuo.* The air of the apparatuses may be removed, either by means of an exhausting syringe, or by filling the whole apparatus with steam, and thus to expel the air.

272. The pressure of the atmosphere is then kept off, either,

a. By stop-cocks, or

b. The barometric mercurial valve.

273. The former method has been used by Mr Tennant, Mr Tritton and Mr Barry; the latter first by myself. It consists in connecting with the condenser a tube thirty inches long, the lower end of which dips into a shallow dish, containing a sufficient quantity of mercury to fill it. The boiler is then heated until the whole air be expelled through the tube, and vapour begins to escape; and upon condensing the vapour in the condenser, the mercury rises in the tube, effectually precluding the pressure of the atmosphere; and the distillation may now be completed at a greatly reduced temperature.

274. Some inconveniences occasionally occur in distillation, which it is necessary to guard against.

275. Boiling or spirting over is prevented by means of a little soap or oil on the surface of the fluid, or by breaking and bursting the bubbles by an agitator, as in the large whisky stills.

276. Burning is prevented by regulating the heat, by suspending the solid subject of the distillation in a basket exposed to the action of the vapour in the head of the still, and by mechanical contrivances for scraping the bottom of the still.

277. The bursting of the apparatus is guarded against by valves and safety tubes.

278. *Abstraction* is the drawing off, by distillation, of a fluid, or a part of it, from a solid substance to which it has been added. Examples: the distilled waters and spirits.

279. *Cohobation* is when a fluid, already distilled from any substance, is redistilled from a fresh quantity of the same substance, to impregnate it more strongly with its virtues; as in double-distilled lavender water.

280. *Dephlegmation* is when, by means of distillation, we render a more volatile fluid stronger, and leave a portion of the water undistilled; as in rectifying spirituous liquors. In some instances, dephlegmation can be effected without distillation, by adding a substance which has a strong affinity for water, and none for the fluid to be dephlegmated; as when we dissolve subcarbonate of potass in spirituous liquors.

281. *Rectification* is the repeated distillation of any fluid, already distilled, to refine it and separate it more completely from foreign impregnations. Commonly in the second distillation some substances are added, which retain or destroy these impregnations; and it is likewise performed more carefully, and with a lower temperature.

282. Rectification is sometimes performed in a single process, without dismounting the apparatus, by redistilling the product into a second receiver from the first, into which the material to assist the rectification has been previously put. It is only necessary to discontinue the application of cold, by which the condensation of the product has been effected in the first receiver, and to substitute the application of a sufficient degree of heat, to drive it over into the second. There are many examples of rectification in the Pharmacopœia; spirits, ether, acids, volatile and empyreumatic oils, ammonia.

283. *Sublimation* differs from distillation only in the form of the product. When it is compact, it is termed a *Sublimate;* when loose and spongy, it formerly had the improper appellation of *Flowers.* The heat, if the open fire be not used, is most commonly applied through the medium of a sand-bath; and the degree of heat, and the depth to which the vessel is inserted in it, are regulated by the nature of the sublimate.

284. Sublimation is performed,

a. To purify a volatile solid, as sulphur, benzoic acid, carbonate of ammonia, calomel, camphor.

b. To procure new combinations, as carbonate of ammonia, muriate of ammonia, muriate of ammonia and iron, calomel, corrosive sublimate, cinnabar.

285. The vessels employed for subliming are crucibles, cucurbits, jars, matrasses with wide necks, or retorts with short and wide necks; and the condensing vessels are an alembic, a second jar, crucible, or the upper half of the matrass, or a second matrass inverted over the first. Sometimes a paper cone will suffice.

286. When there is a narrow orifice between the subliming and condensing vessel, it is in danger of being choked; and it is sometimes difficult to know, in opaque vessels, when the process is finished.

287. The great importance of the elastic fluids in modern chemistry has rendered an acquaintance with the means of collecting and preserving them indispensable.

288. When a gas is produced by any means, it may be received either,

a. Into vessels absolutely empty; or

b. Into vessels filled with some fluid, on which it exerts no action.

289. The first mode of collecting gases may be practised by means of a bladder, moistened sufficiently to make it perfectly pliable, and then compressed so as to empty it entirely. In this state it may be easily filled with any gas. An oiled silk-bag will answer the same purpose, and is more convenient in some respects, as it may be made of any size or form.

290. Glass or metallic vessels, such as balloons, may also be emptied for the purpose of receiving gases, by fitting them with a stop-cock, and exhausting the air from them by means of an air-pump.

291. But the second mode of collecting gases is the most convenient and common.

292. The vessels may be filled previously either,

a. With a fluid lighter; or

b. Heavier than the gas to be received into it.

293. The former method is seldom employed; but if we conduct a stream of any gas heavier than atmospheric air, such as carbonic acid gas, muriatic acid gas, &c. to the bottom of any vessel, it will gradually displace the air, and fill the vessel.

294. On the contrary, a gas lighter than the atmospheric air, such as hydrogen, may be collected in an inverted vessel, by conducting a stream of it to the top.

295. But gases are most commonly collected by conducting the stream of gas into an inverted glass jar, or any other vessel filled with water or mercury. The gas ascends to

the upper part of the vessel, and displaces the fluid. In this way gas may be kept a very long time, provided a small quantity of the fluid be left in the vessel, which prevents both the escape of the gas, and the admission of atmospheric air. Large quantities of gas are kept in various apparatus constructed for the purpose called Gas-holders, or, when furnished with the means of measuring the quantity, Gasometers.

296. The vessels may be of various shapes; but the most commonly employed are cylindrical. They may be either open only at one extremity, or furnished at the other with a stop-cock.

297. The manner of filling these vessels with fluid, is to immerse them completely in it, with the open extremity directed a little upwards, so that the whole air may escape from them, and then inverting them with their mouths downwards.

298. For filling them with convenience, a trough or cistern is commonly used. This either should be hollowed out of a solid block of wood or marble; or it may be constructed of wood, which should be well painted, or lined with lead or tinned copper, or it may be made of tin-plate well painted or japanned. Its size may vary very much; but it should contain a sufficient depth of fluid to cover the largest transverse diameter of the vessels to be filled in it. At one end or side, there should be a shelf for holding the vessels after they are filled. This shelf should be placed about an inch or half an inch below the surface of the fluid. It may be fixed or moveable, and should be perforated with several holes, forming the apices of corresponding conical excavations on the lower side, through which, as through inverted funnels, gaseous fluids may be more easily introduced into the vessels placed over them. In general, the vessels used with a mercurial apparatus should be stronger and smaller than those for a water-cistern.

299. We should also have a variety of glass and elastic tubes for conveying the gases from the vessels in which they are formed to the funnels under the shelf.

300. *Congelation* is the reduction of a fluid into a solid form, in consequence of the abstraction of caloric. The means employed for abstracting caloric are,

a. The contact of cold bodies, which abstract a proportion of the heat;

b. The evaporation of volatile fluids. The evaporation of some fluids is so rapid, that the remaining portion is frozen. This may be assisted by removing the pressure of the atmosphere, as in the Cryophorus, and in Professor Leslie's process for freezing.

c. The liquefaction of solids, during which the caloric necessary to effect it becomes latent;

d. The solution of saline bodies. In this process also heat becomes latent, and it is the most powerful means of producing cold which we possess.

301. Congelation is much used in chemical experiments; and cooling, so essential in many pharmaceutic processes, depends upon the same principles.

302. *Coagulation* is the conversion of a fluid into a solid of greater or less consistence, merely in consequence of a new arrangement of its particles, as during the process there is no separation of caloric or any other substance. The means of producing coagulation are, increase of temperature, and the addition of certain substances, as alcohol, acids and runnets.

303. Coagulation is a property almost peculiar to animal substances, and especially to fibrine and albumen; and the coagulation of these substances is permanent, which cannot be rendered again fluid without decomposition.

304. Coagulation is used in pharmacy for clarification.

305. *Gelatinization* is the concretion of a fluid into a soft solid, which may be again liquefied by a slight increase of heat, as the gelatinization of animal jelly, of vegetable jelly, of starch and of soap.

306. The processes of pharmacy may be arranged into those of combination, and those of decomposition *.

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* The classification of the processes of pharmacy into those of combination and decomposition is convenient, but not correct, as chemical combination rarely occurs without some degree of decomposition. Buchner assumes two degrees of combination and decomposition. If quicklime be dissolved in water, the solution is transparent, and they cannot be separated by mechanical means; but the specific properties of the water and the lime are not altered; the lime is still caustic, and the water transparent, fluid, and vaporizable. This he calls a combination of the first degree. But if quicklime be dissolved in vinegar in certain proportions, the peculiar properties of each disappear, the lime is no longer caustic, nor the vinegar acid, and a new substance, a neutral salt, is produced. This is a combination of the second degree, which might also be called *Union*, as they have become one substance. In like manner, there are two degrees of decomposition. If we expose a solution of lime in vinegar to heat, the water is expelled, and a dry salt remains, both the water and salt retaining their peculiar properties. This is an instance of separation of the first degree. But if sulphuric acid be poured upon this salt, the acetic acid will be evolved, having properties quite different from those it possessed in the salt. This is a decomposition of the second degree.

COMBINATION.

307. Bodies are either simple or compound.

308. A simple substance is a mass of elementary particles, and therefore all necessarily homogeneous.

309. A compound substance contains heterogeneous particles, and then is composed of more elements than one.

310. Compound bodies may be divided into

a. *Primary compounds*, consisting of simple substances combined with each other. These may be subdivided into binary, ternary, quaternary, &c. according to the number of their constituents.

b. *Secondary compounds*, consisting of compound bodies combined with simple bodies, or with each other.

311. This division is convenient, but arbitrary, as we are in fact ignorant of what are really simple bodies, and can-

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BUCHNER'S CLASSIFICATION OF FORMS OF MEDICINES PROCURED BY OPERATIONS OF THE FIRST DEGREE.

Combination.
Solutions.
Mucilages.
Emulsions.
Mixtures.
Drops.
Draughts.
Tinctures.
Juleps.
Gargles.
Eye-waters.
Fomentations.
Washes.
Injections.
Honeys.
Syrups.
Salves.
Cerates.
Balsams.
Liniments.
Plasters.
Soaps.

Separation.
Infusions.
Decoctions.
Infused Decoctions.
Boiled Infusions.
Tinctures.
Essences.
Elixirs.
Wines.
Vinegars.
Solutions in Oil.
Distilled Waters and Spirits.
Robs.
Extracts.
Pulps.
Jellies.
Resins.
Volatile Oils.

OPERATIONS OF THE SECOND DEGREE.

Via humida.

Solution—Deliquescence—Mixture—Neutralization—Evaporation—Distillation—Evolution of gas—Rectification—Crystallization—Precipitation—Coagulation—Congelation—Efflorescence—Fermentation.

Via sicca.

Trituration—Incandescence—Fusion—Detonation—Sublimation—Ustulation—Charring—Dry distillation—Incineration.

not ascertain the manner of combination in bodies compounded of three or more elements.

312. The most minute particles into which any substance can be divided, similar to each other, and to the substance of which they are portions, are termed its *Integrant particles.*

313. The integrant particles,

a. Of simple substances are also their elementary particles;

b. Of primary compounds are composed of elementary particles;

c. Of secondary compounds are composed of intermediate particles.

314. Chemical combination is the intimate union of heterogeneous particles. It results from the exertion of the attraction of affinity, and is therefore subjected to all the laws of affinity.

315. Affinity is one of the species of attraction, and is regulated by the following laws:

a. It does not act at sensible distances.

b. It is exerted only between particles of different species.

c. It is exerted by different bodies, with different degrees of force; and hence it was called *Elective Attraction.*

d. It unites bodies in definite proportions; and when bodies combine in more proportions than one, these are multiples of each other.

e. It unites a first proportion of one body with another, more strongly than a second; a second than a third, and so on; and hence it is in the inverse ratio of saturation *.

f. It is influenced by cohesion, specific gravity, elasticity and temperature.

g. It is often accompanied by a change of temperature.

h. Substances chemically combined acquire new properties †.

i. Substances chemically combined cannot be separated by mechanical means.

k. The action produced by different affinities, existing in one substance, is called the *Resulting affinity.*

316. The neutralizing power of all bodies has a certain

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* When a body refuses to combine with an additional proportion of another body, it is said to be *saturated* with it.

† When they reciprocally suspend their original properties, they are said to *neutralize* each other.

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determinate proportion, to discover which the efforts of modern chemists is directed. Upon this principle the doctrine of chemical equivalents is founded, of which tables have been constructed, supposed to represent also the ratio of the weights of their integrant particles or their atomic weights. Some chemists have assumed as unity Hydrogen, as being the least atomic weight among material substances, and others Oxygen, which is preferable, both on account of the importance of its agency in chemical operations, and that the relation of the representative numbers is more easily perceived. Upon the same principle Dr Wollaston has constructed a logometric sliding scale, which is of great practical use.

317. Affinity is

- a. *Simple*, when two bodies unite, in consequence of their mutual attraction, whether these bodies be themselves simple, as oxygen and hydrogen, or compound, as sulphuric acid and potash, and even although, in the latter case, it be attended with decomposition, as when sulphuric acid unites with the potash of salt of tartar;
- b. *Compound*, when there is more than one new combination, and when the new arrangement would not have taken place, in consequence of the attractions tending to produce either combination singly, as when solutions of muriate of lime and carbonate of ammonia decompose each other mutually;
- c. *Disposing*, when bodies unite not merely in consequence of the affinity they possess for each other; but of the affinity which the compound they are about to form has for another substance present, with which it immediately combines; thus iodine added to a solution of potash decomposes the water to form iodic and hydriodic acids.

318. The attractions which tend to preserve the original arrangement of bodies presented to each other are denominated *Quiescent attractions*; those which tend to destroy the original, and to form a new arrangement, are termed *Divellent attractions.*

319. It is evident that no new arrangement can take place, unless the divellent be more powerful than the quiescent attractions.

320. To produce the chemical union of any bodies, it is necessary,

1. That they possess affinity for each other;
2. That their particles be placed into actual contact;

3. That the strength of the affinity be greater than any counteracting causes which may be present.

321. The principal counteracting causes of chemical union are,

1. The attraction of aggregation;
2. Gaseous repulsion of particles;
3. Affinities for other substances.

322. The attraction of aggregation is overcome by means of

1. Mechanical division.
2. The action of caloric.

323. The gaseous repulsion of particles is prevented from operating, by presenting the bodies to each other before they have assumed the form of gas, or, as it is called, in their nascent state, or by flame, the electic spark or sudden compression, which probably operate by forcing the particles within the sphere of attraction.

324. The means to be employed for overcoming the action of other affinities will be treated of under Decomposition.

325. Combination is facilitated by increasing the points of actual contact, or by rendering them closer,

1. By mechanical agitation;
2. By condensation; compression.

326. The processes employed for producing combination may be considered,

1. With regard to the nature of the substances combined; and,
2. To the nature of the compound produced.

327. There are many instances of bodies of all forms of aggregation entering into chemical union with other bodies of the same form, or of different forms, and producing compounds of various forms of aggregation.

328. The combination of gases with each other, in some instances, takes place when simply mixed together: thus nitrous and oxygen gases combine as soon as they come into contact; in other instances, it is necessary to elevate their temperature to a degree sufficient for their inflammation, either by means of the electric spark, or the contact of an ignited body, as in the combination of oxygen gas with hydrogen gas, or by an equivalent degree of pressure.

329. When gases combine with each other, there is generally a considerable diminution of bulk, and not unfrequently they are condensed into a liquid or solid form. But when the combination is effected by ignition, a violent ex-

pansion previously takes place, in consequence of the increase of temperature.

330. When gases combine with gases, the resulting compound is either,

a. Gaseous; as nitrous oxide, ammonia and muriatic acid;

b. Liquid; as water;

c. Solid; as carbonate and muriate of ammonia.

331. When gases retain the gaseous form after their combination with each other, they either

a. Retain their aggregate volume; as in atmospheric air, nitrous gas and muriatic acid;

b. Or are condensed to one-half; as in the formation of ammonia;

c. Or to one-third; as in nitrous acid gas.

332. Gases dissolve liquids, or seem to dissolve them, as in all cases of spontaneous evaporation. The volume of the gas is not altered in consequence of such solution.

333. Gases dissolve solids, and in consequence of the combination undergo either

a. Expansion. The expansion is a multiple of the original volume; as carbonic oxide, which is twice the volume of the oxygen it contains;

b. No change; as carbonic acid, sulphuretted hydrogen gas;

c. Condensation. The condensation is a multiple of the original volume, as bihydroguret of phosphorus, which is half the volume of the hydrogen.

334. Gases are absorbed by fluids, which either

a. Remain fluid after saturation, as water saturated with ammonia, muriatic acid, carbonic acid, &c.

b. Or become solid, as mercury, various melted metals, by the absorption of oxygen.

c. Or dissolved substances are precipitated by the absorption of gas, as carbonate of lime is precipitated from lime-water.

335. The maximum volume of each gas absorbable by any fluid is always determinate; but the proportion increases with the lowness of temperature and the degree of pressure. The volume of the liquid is always increased by the absorption, as in the saturation of water with ammonia or muriatic acid.

336. Fluids,

1. Are dissolved in gases;
2. Or absorb them;

3. Combine with fluids;
4. Dissolve solids;
5. Or are rendered solid by them.

337. The proofs of the combination of fluids are,

1. Their apparently perfect union; as evinced by their remaining transparent; their not separating according to their specific gravity, and their not being separable by mechanical means; as when dilute alcohol or acid is added to water.
2. Condensation, and evolution of heat, as in strong sulphuric acid or alcohol with water.
3. Change of properties, as the union of alkaline with acid solutions.
4. Change of form of aggregation, either precipitation, as from sulphuric acid with lime-water; or effervescence, as from solution of a carbonated alkali with an acid.

338. Solids are,

1. Dissolved in gases, when they either do not alter their volume, but increase their specific gravity, or alter their volume always in a multiple ratio.
2. Absorb gas.
3. Are dissolved in fluids—*Solution.*
4. Solidify fluids; as in the slaking of lime and the setting of plaster of Paris.
5. Act upon solids; rarely, unless promoted by mechanical means, as friction or percussion; or by heat.

339. *Solution* is the diminution of aggregation in any solid or fluid substance, in consequence of its entering into chemical combination. The substance, whether solid, as sugar, or fluid, as volatile oil, whose aggregation is lessened, is termed the *Solvend;* and the substance, by whose agency the solution is effected, is often called the *Menstruum* or *Solvent,* as water or alcohol.

340. Solution is said to be performed *via humida,* when the natural form of the solvent is fluid; but when the agency of heat is necessary to give the solvent its fluid form, the solution is said to be performed *via sicca.*

341. Many of the pharmaceutical preparations are instances of solution in various menstrua. They are attended either,

a. With no change of property.

Water affords syrups, mucilages, emulsions, saline solutions.

Alcohol, tinctures, spirits, elixirs, liqueurs.

Ether, medicated ethers: dissolves caoutchouc.
Acetic acid, medicated vinegars.
Volatile oil dissolves resins.
Fixed oil dissolves resins, fats, and oxide of lead.
Mercury forms amalgams by dissolving other metals.

b. With change of property.

Acid liquors dissolve dry alkalies, earths, and metallic oxides.
Alkaline liquors dissolve solid acids, resins, solid fats, animal substances.

342. Solutions *via sicca* are rare in pharmacy. The solvents are,

Sulphur.
Phosphorus.
Metals.

343. The dissolving power of each menstruum is limited, and is determinate with regard to each solvend. The solubility of bodies is also limited and determinate with regard to each menstruum.

344. When any menstruum has dissolved the greatest possible quantity of any solvend, it is said to be saturated with it. Saturation is here employed in a different sense from what it is in regard to saturation between substances of opposite chemical qualities. To the latter, neutralization would be more appropriate. In some cases, a menstruum, although saturated with one substance, is still capable of dissolving others. Thus a saturated solution of muriate of soda will dissolve a certain quantity of nitrate of potass, and after that a portion of muriate of ammonia.

345. The dissolving power of solvents, and consequently the solubility of solvends, is generally increased by increase of temperature; and conversely, this power is diminished by diminution of temperature; so that, from a saturated solution, a separation of a portion of the solvend generally takes place on any reduction of temperature. This property becomes extremely useful in many chemical operations, especially in crystallization.

346. Some substances, as lime and magnesia, are rather more soluble in cold than in hot water; the solubility of others is not affected by temperature, and in some there appears a singular and inexplicable anomaly, by which they are more soluble, less soluble, and again more soluble by progressive increments of heat, as in sulphate of soda and muriate and nitrate of baryta.

347. Particular terms have been applied to particular cases of solution.

348. The apparent solution of a fluid in the atmosphere is termed *Spontaneous evaporation.* It is promoted by exposing a large surface, by frequently renewing the air in contact with the surface, and by increase of temperature.

349. The quickness with which fluids evaporate is in proportion to the elasticity of their vapour, and this is sometimes so great as to be a source of much inconvenience. It appears that the nature of the covering by which they are attempted to be confined has considerable influence, and that it allows those vapours to pass most readily through it with which it has affinity.

350. Some salts have so strong an affinity for water, that they attract it from the atmosphere in sufficient quantity to dissolve them. They are said to *deliquesce.*

351. In old pharmacy, deliquescence was used as the means of obtaining a strong solution of some saline bodies; and, according to the Dublin Pharmacopœia of 1807, the *Aqua subcarbonatis kali* is still made in this fortuitous way; which, from its oiliness, was formerly called *Oleum tartari per deliquium.*

352. Deliquescent salts must be kept in a warm dry place; some, as muriate of lime, attract moisture from the driest air, and must be kept in very closely stopped bottles. Advantage is taken of this property in some pharmaceutic processes; as in the rectification of alcohol or ether.

353. Other salts, on the contrary, retain their water of crystallization with so weak a force, that the atmosphere attracts it from them, so that they crumble into powder. These are said to *effloresce.* Efflorescence, in this case, is owing to the evaporation of the water of crystallization, and hence it has been proposed to term it *Deaquescence,* to distinguish it from another kind of efflorescence, which takes place in iron-clay-slate, and on new plastered walls, which is owing to the shooting of acicular crystals from the absorption of water of crystallization.

354. Deaquescence is employed as a pharmaceutical process in the preparation of the *sulphas sodæ siccatum,* and it is promoted by exposing a large surface, and by a free current of warm dry air.

355. Solution is either total or partial. Total solution takes place when the solvend is of a homogeneous nature, and is entirely dissolved if the menstruum be used in suffi-

cient quantity. Many examples of total solution occur in pharmacy.

Saline solutions of all kinds, acid, alkaline, neutral, earthy, metallic.
Mucilages; solutions of gum in water.
Syrups; solutions of sugar in water.
Tincture of pure resins and camphor in alcohol.
Solution of camphor in oil.
Solution of resin in oil.

356. Partial solution is when the body acted upon is of a heterogeneous nature, consisting of some principle or principles soluble, and of others insoluble in the menstruum employed; *e. g.* bone, from which, by means of boiling water, we can dissolve the gelatin, and leave the earthy phosphates; or, by means of weak acid, we can dissolve the earthy salt, and leave the gelatin.

357. Solution is therefore employed to separate substances (for example, saline bodies,) which are soluble in the menstruum, from others which are not.

358. In some cases, our object is to obtain the soluble substance in a state of purity: the operation is termed *lixiviation.* In this as small a quantity of the menstruum as is sufficient is used, in order that there may be less solution of heterogeneous matter, and less trouble is concentrating the solution. It is by lixiviation that the alkaline salts are extracted from the ashes of vegetable matters, and their solutions are termed Leys; *Lixivia.*

359. In other cases, solution is employed to free an insoluble substance from soluble impurities. It is termed *Edulcoration,* which is best performed by using a very large quantity of the menstruum applied in successive quantities. The term edulcoration implies that the insoluble substance is to be washed with successive quantities of water, until it comes off insipid. Sometimes the taste is not trusted to; and a chemical test is employed, to ascertain that the water comes off unimpregnated.

360. Organic products being generally composed of heterogeneous substances, are only partially soluble in the different menstrua. To the solution of any of these substances, while the others remain undissolved, the term *Extraction* is applied; and when, by evaporation, the substance extracted is reduced to a consistent form, it is termed an *Extract.* The proper preparation of Extracts, so as to obtain in a small bulk the active principles of medicinal substances, is a very important process in pharmacy.

361. In the extraction of the active principles of organic substances, the menstruum is either applied cold, or is assisted by heat, and different titles have been given to the processes.

Cold extraction, includes infusion and maceration.

Hot extraction, digestion and decoction.

362. Extracts get the title of *hard* or *soft* according to the consistence to which they are reduced by evaporation, and are called *watery* or *spirituous* according to the menstruum employed.

363. *Infusion* is employed to extract the virtues of aromatic and volatile substances, which would be dissipated by decoction, and injured by maceration, and to separate substances of easy solution from others which are less soluble. The process consists in pouring the menstruum upon the substances to be infused, placed in a proper vessel, covering it up, agitating it frequently, and after a due time straining or decanting off the liquor, which is then termed the Infusion, if water be the menstruum employed.

364. Watery infusions are extremely apt to spoil, and are commonly extemporaneous preparations. Sometimes a proportion of spirit, or tincture is added to make them keep longer.

365. Infusions are sometimes directed to be made with cold, sometimes with boiling water. The latter is more active, and on some occasions seems necessary for extracting the active principle, as in making common tea. In other cases the use of boiling water is inadmissible, in consequence of its either dissipating the specific aroma or other volatile matter, or its taking up some principle while hot, which it deposits on cooling: thus the cold infusion of cinchona remains transparent, while the hot infusion becomes turbid, and hence in the Pharmacopœia there are distinct formulæ for each.

366. Some substances yield their soluble matter slowly, and must be left a considerable time in contact with the menstruum. This is the case with substances whose cuticle is entire, as tea leaves; or their texture dense, as guaiac wood, or are somewhat resinous, as cinchona bark.

367. Others yield their soluble matter so readily, that when the menstruum is added in successive portions, the first is strong, the last weak, and it is necessary to mix them. This is daily observed in the preparation of coffee in the common coffee biggin.

368. Various means have been proposed and employed

to assist the action of the menstruum. Count de la Garaye employed long trituration, and Real and Römershausen strong compression; but the advantages of neither are equal to the expense.

369. *Maceration* differs from infusion, it being continued for a longer time, and can only be employed for substances which do not easily ferment or spoil. Most of the officinal infusions are directed to be macerated for a greater or shorter length of time. By protracting maceration too long, the preparation often turns out less elegant, as the coarser and mucilaginous principles are not so quickly dissolved as the finer aromatic bitters.

370. *Digestion* differs from maceration only in the activity of the menstruum being promoted by a gentle degree of heat, from 60° to 90° Fahrenheit. It is commonly performed in a glass matrass, which should only be filled one-third, and covered with a piece of wet bladder, pierced with one or more small holes, so that the evaporation of the menstruum may be prevented as much as possible, without risk of bursting the vessel. The vessel may be heated, either by means of the sun's rays, of a common fire, or of the sand-bath; and when the last is employed, the vessel should not be sunk deeper in the sand than the portion that is filled. Sometimes, when the menstruum employed is valuable, a distilling apparatus is used to prevent waste. At other times, a blind capital is luted on, or a smaller matrass is inverted over a larger one; and as the vapour is condensed in it, and runs back into the larger matrass, the process in this form has got the name of *Circulation.*

371. *Decoction* is performed by subjecting the substances operated on to a degree of heat, which is sufficient to boil the menstruum, and can only be employed with advantage for extracting principles which are not volatile, and from substances whose texture is so dense and compact as to resist the less active methods of solution. When the menstruum is valuable, that portion of it which is converted into vapour is generally saved by condensing it in a distilling apparatus. Many decoctions, as those of all astringent substances, become turbid on cooling; and it is of importance to know the chemical nature of the deposit, as it is sometimes directed to be removed, and at other times to be preserved, often without any principle. Sometimes the action of the menstruum is increased by raising its temperature above its boiling point by means of compression, as in Papin's digester.

DECOMPOSITION.

372. *Decomposition* is the separation of bodies which were chemically combined.

373. It can only be effected by the agency of substances possessing a stronger affinity for one or more of the constituents of the compound, than these possess for each other, or when the divellent are more powerful than the quiescent affinities.

374. Decomposition has acquired various appellations, according to the phenomena which accompany it.

375. *Dissolution* differs from solution in being accompanied by the decomposition, or a change in the nature of the substance dissolved. Thus, we correctly say, a solution of lime in muriatic acid, and a dissolution of chalk in muriatic acid.

376. Sometimes a gas is separated during the action of bodies on each other. When this escapes with considerable violence and agitation of the fluid, it is termed *effervescence.* If the gas be very soluble in water, as carbonic acid or sulphuretted hydrogen, the effervescence is most considerable towards the end of the process, after the water has become saturated with it.

377. The gas is very frequently allowed to escape into the atmosphere, but at other times is either collected in a pneumatic apparatus, or made to enter into some new combination.—The vessels in which an effervescing mixture is made, should be high and sufficiently large, to prevent any loss of the materials from their running over; and in some cases the mixture must be made slowly and gradually.

378. *Precipitation* is the reverse of solution. It comprehends all those processes in which a solid is obtained by the decomposition of a solution. The substance separated is termed a *Precipitate,* if it sink to the bottom of the fluid, as in the earths or oxides; or a *Cream,* if it swim above it, as camphor. Precipitates occur in a great variety of forms, crystallized, amorphous, powdery, flaky, grumous, loose, adhesive. Precipitation, like solution, is performed, either *via humida*, or *via sicca.*

379. The objects of precipitation are,

1. The separation of substances from solutions in which they are contained;
2. The purification of solutions from precipitable impurities:
3. The formation of new combinations.

380. Precipitation is effected,

1. By lessening the quantity of the solvent by evaporation; Crystallization, Deposition;
2. By diminishing its solvent power;
   a. By reduction of temperature; Congelation.
   b. By dilution, as in the precipitation of the submuriate of antimony, and subnitrate of bismuth.
3. Or by the addition of some chemical agent, which, from its more powerful affinities,
   a. Either combines with the solvent, and precipitates the solvend, as metallic oxides by alkalies,
   b. Or forms an insoluble compound with some constituent of the solution, as baryta by sulphuric acid.
   c. By double affinity, as when muriate of lime is decomposed by sulphate of potass.

381. The two first means of precipitation have been already noticed. Indeed they are rarely considered as instances of precipitation, as the effect is gradual, and the precipitated matter often assumes determinate figures.

382. In performing it in the last manner, we may observe the following rules:

1. The solution and precipitant must possess the requisite degree of purity.
2. The solution should be perfectly neutralized to avoid unnecessary consumption of the solvent or precipitant.
3. The one is to be added slowly and gradually to the other. In some instances it is not immaterial whether the precipitant be added to the solution, or the solution to the precipitant, as in Mr Chenevix's mode of preparing James's powder.
4. After each addition, they are to be thoroughly mixed by agitation.
5. We must allow the mixture to settle, after we think that enough of the precipitant has been added, and try a little of the clear solution, by adding to it some of the precipitant: if any precipitation takes place, we have not added enough of the precipitant. This precaution is necessary, not only to avoid loss, but, in many instances, the precipitant, if added in excess, redissolves, or combines with the precipitate.

383. After the precipitation is completed, the precipitate

is to be separated from the supernatant fluid, by some of the means already noticed, as decantation or filtration.

384. When the precipitate is the chief object of our process, and when it is not soluble in water, it is often advisable to dilute, to a considerable degree, both the solution and precipitant, before performing the operation. When it is only difficultly soluble, we must content ourselves with washing the precipitate, after it is separated, by filtration. In some cases, the separation of the precipitate is much assisted by a gentle heat.

385. *Crystallization* is a species of precipitation, in which the integrant particles of the solvend, on separating from the solution, assume certain determinate forms, generally prismatic or pyramidal.

386. The conditions necessary for crystallization are,

1. That the integrant particles of the substance have a tendency to arrange themselves in a determinate manner when acted on by the attraction of aggregation;
2. That they be disaggregated, at least so far as to possess sufficient mobility to assume their peculiar arrangement;
3. That the causes disaggregating them be slowly and gradually removed.

387. The means by which the particles of bodies are disaggregated, so as to admit of crystallization, are, solution, fusion, vaporization, or mechanical division and suspension in a fluid medium.

388. The means by which the disaggregating causes are removed, are, evaporation, reduction of temperature, and rest.

389. The crystallization of dissolved substances is effected,

a. By diminishing the quantity of the solvend;
  1. By adding a substance which has a strong attraction for the menstruum or solvent.
    aa. By adding alcohol, which withdraws the water, crystals of sugar are obtained from syrup, and of ammoniaret of copper from its solution in water.
    bb. Metals, as silver or lead, may be crystallized by slowly decomposing their solution in any acid, by the addition of a metal having a strong affinity for it.
  2. By evaporation.
    aa. Slow; favourable to regular crystallization,

and chiefly employed for salts nearly as soluble in cold as in hot water.

bb. Quick; necessary for deliquescent salts, as muriate of lime.

b. By diminishing the power of the solvent;

1. By reduction of temperature. This is chiefly effective in regard to those salts whose solubility is increased by increase of temperature, and which are thus dissolved in greater quantity than the solvent can retain at a lower temperature. As this is reduced, the excessive portion of salt separates in the most minute state of division, and the integrant molecules arrange themselves in their determinate form of crystallization.
2. By dilution. This is very doubtful.

c. By increasing the force of aggregation among the molecules of the dissolved body;

1. By the sudden admission of the pressure of the atmosphere. This is only applicable when the aggregative force had been suspended by excluding the pressure of the atmosphere, as experimentally shewn with a solution of sulphate of soda.
2. By agitation or tremor, which brings the molecules into closer contact.
3. By the introduction of a nucleus, upon the angles and edges of which the crystallization begins.

390. When a crystal is about to be formed in a solution, it is supposed that a single integrant molecule first separates, and that around this, as a nucleus, other molecules arrange themselves in successive layers.

391. Crystals extend more horizontally than vertically, because the molecules of salts are heavier than their solutions.

392. Some salts, as muriate of ammonia and diabetic sugar, when crystallized by slow evaporation, are apt to vegetate and rise over the edges of the vessel in which they are crystallized, in consequence of the rising of the solution by capillary attraction through the ring of crystals formed around the upper surface; and in this way a succession of crystallizations shoot above those just formed. It is observed that vegetating crystals shoot towards the light, as if attracted by it. The vegetation of crystals is often troublesome, and is prevented by greasing the edge of the vessel.

393. Many substances, on crystallizing, retain a portion of water combined with them, which is essential to their existence as crystals, and is therefore denominated water of

crystallization. Its quantity varies very much in different crystallized substances, and is determinate in regard to each. Other crystals contain no water, and are called *anhydrous*.

394. The liquid which remains after the crystals have separated from it is called the mother-water, and it is sometimes merely too dilute to furnish more crystals without farther concentration by evaporation; or it contains impurities, which prevent the crystallization of the last portion; or it contains only substances of a different nature, more soluble in water, or not crystallizable. Mother-waters are often turned to good account; thus, iodine is prepared from a mother-water got by the soap-makers from kelp, and formerly wasted.

395. Crystals are either perfect or imperfect, regular or irregular, distinct or confused.

396. The beauty and size of the crystals depend upon the purity of the solution, its quantity, and the mode of conducting the evaporation and cooling.

397. Perfect crystals consist of integrant molecules of one kind with or without water of crystallization. The molecules attract each other, and have a tendency to exclude all other matters, whether crystallizable or not.

398. But crystals from impure solutions are seldom perfect at the first crystallization. The presence of foreign matter impedes the free motion and arrangement of the particles. An excessive number of nuclei are formed; the crystals are small, soft and spongy, and retain among their molecules portions of the fluid from which they have separated. Such crystals are purified by repeated solution and crystallization.

399. Some crystallizable substances, especially of a very compound nature, have a great affinity for colouring matter, and obstinately retain it; as in brown sugar-candy.

400. In general the presence of colouring matter prevents regular crystallization, and it is necessary to remove it, either by a solvent, as alcohol, which does not act upon the crystals; or more perfectly by animal charcoal, as in the purification of sulphate of quinia.

401. We may be assured of the purity of a substance whose crystals are hard, finely formed, and free from colour.

402. Confused crystallization takes place,

a. From large crystals penetrating each other in consequence of the nuclei being formed too near to each other; exemplified in fluor spar, sugar and alum;

b. From the crystallization being conducted too rapidly, so that too many nuclei are formed, and the molecules have not time to arrange themselves;

c. From the whole fluid mass crystallizing into one compact mass; as in crystallization by fusion and sublimation.

403. Crystalline texture in compact crystalline masses may be rendered manifest,

a. By immersion in water, which dissolves first those crystals last formed, and filling up the spaces among the more perfect crystals;

b. By washing over metallic surfaces, as tin-plate, with a weak acid, which acts in the same way.

404. The means by which bodies, which have been disaggregated by solution in a menstruum, are made to crystallize more regularly, vary according to the habitudes of the bodies with their solvents and caloric.

405. When the salt is not more soluble in hot than in cold water, a succession of pellicles is formed, by means of gentle evaporation on the top of the solution, which either are removed, or permitted to sink to the bottom by their own weight; and the evaporation is continued until the crystallization be completed. These salts commonly contain little water of crystallization.

406. But when the salt is more soluble in boiling than in cold water, the evaporation is only continued until a drop of the solution, placed upon some cold body, shews a disposition to crystallize, or at farthest only until the first appearance of a pellicle. The solution is then covered up, and set aside to cool; and the more slowly it cools, the more regular are the crystals, which commonly contain much water of crystallization.

407. When very large and beautiful crystals are wanted, they may be obtained by laying well-formed crystals in a saturated solution of the same salt, and turning them every day. In this way their size may be considerably increased, though not without limitation; for after a certain time, they lose the sharpness of their angles and edges, and grow smaller instead of larger.

408. When bodies are merely suspended in a state of extreme mechanical division, their crystallization is effected by rest and drying; as in starch and basaltes.

409. When they are disaggregated by fusion or vaporization, the regularity of their crystals depends on the slowness with which their temperature is reduced; for if cooled too quickly, their particles have not time to arrange themselves,

and are converted at once into a confused or uniform solid mass. Thus glass, which, when cooled quickly, is so perfectly uniform in its appearance, when cooled slowly, has a crystalline texture. But in order to obtain crystals by means of fusion, it is often necessary, after the substance has begun to crystallize, to remove the part which remains fluid; for otherwise it would fill up the interstices among the crystals first formed, and give the whole the appearance of one solid mass. Thus, after a crust has formed on the top of melted sulphur, by drawing out the still fluid part, we obtain regular crystals.

410. As a process in pharmacy, crystallization is of great utility.

a. As a means of purifying saline substances.
b. As presenting crystallizable substances in an uniform state as to composition and concentration.
c. As enabling us, by mere inspection or slight examination, to recognise the nature of saline bodies and their degree of purity.

411. All substances in the act of crystallizing have a tendency to exclude foreign matters, whether crystallizable or not.

412. When the foreign matter is not crystallizable, it remains chiefly in the mother-water; but when its proportion is considerable, it has a tendency to prevent the separation of the crystalline substance, which is to be counteracted by rest and the insertion of a nucleus. Another inconvenience arising from the presence of uncrystallizable foreign matter, is that a portion of it remains interposed among the molecules of the crystals. From this they may be freed by repeated solution and crystallization.

413. Crystallizable substances, which are blended in the same solution, may be separated from each other,

a. By their different solubility in water at 60°. On slow evaporation the salts are deposited in succession, each separate, and the solution is to be poured off from those first formed as soon as the second salt begins to appear;
b. By difference of solubility at 212° and 60°. By boiling, that salt whose solubility is not much greater in boiling than in cold water, separates, and may be removed by skimming or raking out, until the solution become nearly saturated with the salt much more soluble in boiling than in cold water, and which therefore crystallizes alone on the solution being allowed

to cool. Thus carbonate of soda is separated from muriate of potass;

c. By suspending the crystallization of one salt until the other be separated. Thus, in the manufacture of alum and copperas, the latter is allowed to crystallize, and is removed before the portion of alkali is added, which is necessary for the crystallization of the alum;

d. By their different forms. Salts in general retain their distinctive form sufficiently to enable them to be separated, even when crystallized together from the same solution.

414. The uniformity of the constitution of substances well crystallized is so great, that there is no difficulty of making a solution of them of any degree of strength. The great advantage this affords in pharmacy may be strikingly illustrated by the difficulty of obtaining and preserving the preparations of uncrystallizable substances of uniform strength, and of recognising their actual strength.

415. Crystallized substances are often easily recognised by their external characters of

a. Form. To a scientific crystallographer, this is of itself sufficient; for, by a knowledge of the primary forms and their possible modifications, his skill in enucleating, by cleavage, the primary form from any modification, and the accurate admeasurement of angles, he can determine, almost with certainty, every species. By experience also, without a knowledge of scientific crystallography, most crystals are easily determined by their form alone.

b. Size. This character is not so decisive; yet there are some crystals which never exceed a certain size.

c. Grouping. This is also sometimes distinctive. Some crystals often occur distinct; others shoot in bundles from a common centre; others occur massive, either radiated or foliated; some loose and spongy, and others plumose.

d. Colour. Many crystals are in themselves pellucid or semipellucid; others white and almost opaque; some are necessarily coloured, blue, as sulphate of copper; green, as sulphate of iron.

e. Smell. Most salts are without odour, except the carbonate of ammonia, unless they be decomposed by heat, an acid or an alkali.

f. Taste; is a very common means of distinguishing similar salts; the salts of each metal may be almost recognised by the taste, and the whole have a variety of that taste called metallic; the salts of magnesia, lime, potass, soda, are bitter; of alumina, astringent, and of ammonia, pungent; of the vegetable alkaloids, intensely bitter; of alkalis, soapy; of acid salts, sour.

g. Hardness. Some salts are hard and brittle; others hard and elastic, as muriate of ammonia; some almost flexible, as benzoic acid.

h. Volatility. This property also characterises some salts, as the ammoniacal salts, oxide of arsenic.

i. Combustibility. By this test we are at once able to determine whether the salt under examination contains carbon in either its acid or alkali.

j. Solubility. Salts generally resembling each other often differ considerably in their solubility, either in water at different temperatures, or in alkohol.

k. Chemical tests. These, when necessary, are the most decisive of all characters, and whole treatises have been written on their application; but crystals will generally be known without them.

416. The variety of crystalline forms is almost infinite; yet each crystallizable substance assumes only a certain class of them, and never appears in forms belonging to other classes.

417. It is probable, however, that the integrant molecules of each species of crystallizable matter is always of the same form, and that the varied forms under which the same substance appears is owing to accidental causes, which interrupt the regular aggregation of the integrant molecules; and much ingenuity has been exercised to shew how these various modifications may be produced.

418. But natural crystals are easily divided into a number of smaller crystals, and, by analogy, these are supposed to be composed of integrant homogeneous molecules, which admit of no further subdivision.

419. In some instances, the form of the resulting aggregate crystals corresponds with the supposed form of the molecule; thus sea salt crystallizes often in cubes, which, when broken or split into fragments, always exhibits a cubical form; and it is evident, that by an aggregation of small cubes a large cube is easily produced.

420. In many instances, the form of the aggregate crystal differs from that of the integrant molecule, and this difference admits commonly of certain varieties, all of which, however, may be derived as modifications arising from the

regular aggregation of the integrant particles being impeded according to certain laws.

421. It is evident, that in very rare cases only the increment of crystals can take place equally on all sides. If the nucleus attach itself to the bottom or sides of the containing vessel, one side remains without increment, and hence crystals extend more laterally than vertically. If it form at the surface of the solution, the increment will take place chiefly on the lower surface of the crystal and around it, as may be seen in the slow crystallization of sea salt, which thus often forms hollow rectangular pyramids.

422. But very frequently the modifying cause is less evident, and the resulting form is modified in consequence of no addition of molecules attaching themselves to certain angles or edges of the nucleus, or of the crystal after it has acquired a certain size. To this omission of accretion, the term of *decrement* has been given, and various modes or laws of decrement have been pointed out.

423. In consequence of such decrement, an edge may not be completed, and it may be replaced by a plane, when it is said to be truncated, and if the plane incline equally to the two adjacent primary planes, it is a tangent plane; and if the edge be replaced by two planes, it is bevelled.

424. In like manner, the decrement may take place upon a solid angle, which may be replaced by a single plane, which is also called tangent when it inclines equally to the adjacent primary planes, or by three or other number of new planes.

425. By various combinations of such decrements, a number of resulting forms arise, in all of which, however, the form of the elementary molecule may be traced.

426. The form of the elementary molecule may, in many cases, be extracted by means of the property which crystals have of being cut or split in certain directions more readily than in others; and a crystal is said to have a triple, fourfold, or sixfold cleavage, according to the number of directions in which they can be split.

427. Crystals are symmetrical solids, bounded by at least four surfaces, connected by at least six edges, and terminating in at least four solid angles.

428. The surfaces of crystals, as they present themselves, are called their *natural planes,* in contradistinction to its *cleavage planes,* which are produced by splitting or cracking the natural crystal. The external surfaces are sometimes smooth, sometimes streaked.

429. The general forms of crystals are,
Pyramidal,
Prismatic,
Polyhedral.

430. The pyramidal have an angular base, and the edges, uniting their lateral faces, incline towards each other, and meet in a point or summit.

431. Pyramids are either single or double, consisting of two similar and equal pyramids united base to base.

432. Pyramids are distinguished by the number of the angles of the base, or of the lateral faces, 3, 4, 5, 6 sided pyramids, and differ as to the acuteness or obtuseness of the summit angle of these faces, acute and obtuse pyramids.

433. The prismatic crystals have an angular base, and the edges uniting their lateral faces are parallel, and are terminated by a plane parallel and similar to the base.

434. Prisms are either right, placed perpendicularly upon the base; or oblique, inclining from the perpendicular.

435. Prisms are distinguished by the number of lateral faces, 3, 4, 5, 6, 8 sided prisms; the measurement of the angles of the base, and the proportionate height of the crystal to its base; tabular and long crystals.

436. Polyhedral crystals have not any proper base, but consist of a number of sides whose angles are indented between those of the contiguous sides, and which are arranged symmetrically around a centre.

437. They are distinguished by the number of the sides, their forms, and their angles.

438. Crystals are sometimes named from the total number of their sides, as tetrahedron, hexahedron, octahedron, dodecahedron, icosahedron, triacontahedron, enneacontahedron, when the number of sides is 4, 6, 8, 12, 20, 30, 90.

439. Crystals are also often named from the number of the edges, as trigonal, tetragonal, pentagonal, hexagonal, when the number of such edges is 3, 4, 5, 6, &c.

440. Hauy admits only three forms of integrant molecules;

1. The parallelopiped;
2. The triangular prism;
3. The regular tetrahedron.

441. He also reduces the primitive resulting forms to six;

1. The parallelopiped;
2. The regular octohedron;
3. The octohedron with triangular faces;
4. The six-sided prism;

5. The dodecahedron with rhomboid faces;
6. The dodecahedron with isosceles triangular faces.

442. The following table shews Mr Brooke's enumeration of the primary forms, and of the integrant molecules from which he derives them:

Primary forms.	*Molecules.*
Cube.	Cube.
Regular tetrahedron.	
Regular octahedron.	
Rhombic dodecahedron.	
Quadrangular prisms.	Similar prisms.
Octahedron with a square base.	Square prism.
Octahedron with a rectangular base.	Rectangular prism.
Octahedron with a rhombic base.	Rhombic prism.
Rhomboid.	Similar rhomboid.
Hexagonal prism.	Equilateral triangular prism.

443. The most common regular forms are arranged below.

PYRAMIDAL FORMS.

Tetrahedral.

1. Base and sides equilateral triangles. *Regular tetrahedron.*

Octahedral.

2. Square base with equilateral triangular faces. *Regular octahedron.*
3. Square base with isosceles triangular faces. *Octahedron with square base.*
4. Rectangular base with unequal isosceles triangular faces. *Octahedron with rectangular base.*
5. Rhombic base with equal scalene faces. *Octahedron with rhombic base.*

Dodecahedral.

6. Sides, twelve equal rhombs. *Rhombic dodecahedron.*

PRISMATIC FORMS.

Quadrangular base—right angled.

7. Base and faces all square. *Cube.*
8. Base square, sides rectangular. *Right prism with a square base.*
9. Base and sides rectangular. *Right rectangular prism.*

Quadrangular base—oblique angled.

10. Rhombic base and sides. *Rhomboid.*

11. Rhombic base, and square, or rectangular sides. *Right rhombic prism.*
12. Rhombic base, and sides oblique angled parallelograms. *Oblique rhombic prism.*
13. Base an oblique angled parallelogram; sides rectangular. *Right oblique angled prism.*
14. Base and sides oblique angled parallelograms. *Doubly oblique prism.*

Hexangular base.

15. Base a regular hexagon; sides rectangular or square. *Regular hexagonal prism.*

OXYGENIZEMENT.

444. Oxygenizement, in its most general sense, expresses the combination of any substance, simple or compound, with oxygen *, whatever may be the chemical nature of the product.

445. The combination of oxygen is the object of many chemical and pharmaceutical processes.

446. *Oxygenizement* is an example of chemical union, and is subjected to all the laws of affinity. It requires the presence and contact of oxygen, and of another substance possessing affinity for it.

447. By its union with oxygenizable substances, oxygen undergoes various changes in its properties. In many instances the compounds of oxygen are fluid or solid, opaque, coloured, incapable of supporting inflammation, and deleterious to animal or vegetable life. The changes which the oxygenizable bases undergo, are no less conspicuous. Their

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* *Oxygen* is the principle on which most of the chemical qualities of atmospheric air depend. Its tendency to combination is so strong, that it has never been procured in a separate state. Oxygen gas, or the combination of oxygen with caloric, is its most simple form. This is permanently elastic, transparent, inodorous, and insipid. 100 cubical inches at 60° Fahrenheit, and 30 inches mercurial pressure, weigh 33.195 grains. Its specific gravity in relation to water is 0.00135; and in relation to hydrogen, its specific gravity is 16 to 1; its power of refracting light 1958, hydrogen being 1000; and its capacity for heat 4.6, water being assumed as unity. It eminently supports inflammation, is necessary for respiration and vegetation, and is decomposed in all these processes; it constitutes 0.20 of the bulk of atmospheric air. Water at 60° takes up $\frac{1}{27}$ of its bulk of the gas. Oxygen is also a constituent in water, in all acids and metallic oxides, and in almost all animal and vegetable substances. It is separated from many of its combinations by the rays of the sun, especially the most refrangible; and in electric decomposition it is always attracted by the positive pole, and is, in fact, the most electro-negative of substances.

form, colour, taste, odour, density, permeability to light and electricity, specific caloric, and, finally, their affinities, are often totally altered.

448. The bases capable of uniting with oxygen, are either simple undecomposed substances, yielding simple oxides and acids, as carbonic oxide and carbonic acid; or are compound bodies, which yield either compound oxides and acids, or more than one oxide or acid. Thus, vegetable substances have carbon and hydrogen for a base, and animal substances, carbon, hydrogen, and azote; vinegar and margaric acid are compound acids; but, by more vivid oxygenizement, they may be converted into two or three binary compounds, one of which is always carbonic acid.

449. The simple substances, and probably also the compound bases, unite with definite proportions of oxygen, and they are named accordingly Protoxide, Deutoxide, Tritoxide, Quadroxide, as containing with each proportion of the radical 1, 2, 3 or 4 proportions of oxygen. When it is united with the maximum of oxygen, it is called a Peroxide; and when two proportions of the radical are united with one of oxygen, it is a Suboxide.

450. The oxides present a great variety of characters, some classes of which are distinguished by names. Water, the Alkalies, Earths, Metallic Oxides, and vegetable and animal substances are all oxides.

451. The same simple base also furnishes different acids according to the proportion of oxygen with which it is united, and chemists have endeavoured to distinguish them by terminations or prefixed particles. A less degree of acidity is indicated by the termination *ous*, as sulphurous; and a larger by *ic*, as sulphuric. Sometimes *Oxy* is prefixed, and sometimes with the addition of *Hyper*, to indicate an additional proportion of oxygen, as formerly Oxymuriatic acid and Hyperoxymuriatic acid. *Per* is sometimes prefixed to indicate saturation with oxygen in an acid, as Perchloric acid; and *Hypo* is prefixed to denote a less proportion of oxygen, as Hyposulphurous and Hyposulphuric acid.

452. Oxygenizable bases attract oxygen with very different degrees of force. This attraction is much influenced by temperature. Thus charcoal, which at ordinary temperatures seems to possess no attraction for oxygen, unites with it rapidly and almost inseparably, when heated to ignition.

453. In many instances, oxygenizement is so strongly opposed by cohesion, that it does not take place unless assist-

ed by a degree of heat sufficient to melt or vaporise the oxygenizable base.

454. With regard to the phenomena of combination, the oxygenizement may take place, either,

- *a.* Without the production of heat and light, as, for example, in the rusting of iron, the oxygenation of sulphurets and chlorides, to express which there is no other than the generic term *oxygenizement;* or,
- *b.* With the production of heat and light; *combustion.*
    1. In substances which remain fixed at the temperature necessary for their combustion, there is no other more specific term;
    2. In substances which exist as gases, or are previously reduced to the state of vapour by the temperature necessary, it is termed *inflammation;* and if it proceed with very great violence and rapidity, *deflagration.*

455. Oxygenizement is often accompanied by the extrication of caloric and light in a very conspicuous degree. To these the term combustion should be confined; and only such oxygenizable bases as are capable of exhibiting these phenomena are combustible. These phenomena depend upon the new compound having a weaker affinity or less capacity than its constituents for light and caloric, which are therefore extricated.

456. If the combustible body be vaporized, flame is produced, and the process is then denominated *inflammation.*

457. *Deflagration,* from its violence, must always be performed with caution. The common mode of conducting this process is, to introduce the substances to be deflagrated together into any convenient vessel, commonly an iron-pot, or crucible, heated to redness. But to obviate any inconvenience, and to insure the success of the process, they are previously made perfectly dry, reduced to powder, and thoroughly mixed together. The compound is then deflagrated gradually, generally by spoonfuls; but we must take care always to examine the spoon, lest a spark should adhere to it, which might set fire to the whole mass. During the process, the portion introduced should be frequently stirred. Polychrest salt of the Edinburgh Pharmacopœia is prepared by deflagration, and it is also employed to procure the protoxide of antimony for the preparation of tartar-emetic. Oxide of zinc is another example.

458. The oxygen necessary for the process of oxygenation may be derived from various sources.

1. Atmospheric air.
    - *a.* By mere exposure some metals, as potassium, get covered with a coating of oxide; and in many other processes, as in the acetous fermentation, oxygen is absorbed. The oxygen of the atmosphere is instantly absorbed by nitrous gas.
    - *b.* Some substances spontaneously absorb oxygen more rapidly with the phenomena of combustion and inflammation, or take fire on exposure to the atmosphere, as phosphuretted hydrogen gas and phosphorus.
    - *c.* Many substances exhibit the same phenomena when kindled, as alcohol, ether, wood, and inflammables generally, and are enabled, by the heat produced, to continue the process.
    - *d.* Other substances require the temperature to be artificially kept up to a certain degree to be oxidized in the open air.
2. Oxygen gas. In this the action in all the preceding cases is more energetic, and substances, which do not burn in the atmosphere, undergo combustion, as iron-wire, or inflammation, as zinc-wire.
3. Atmospheric air, assisted by the presence of water. In this way the peroxide of iron is formed, and the rusting of some other metals occur.
4. Oxides.
    - *a.* Water alone. In this case hydrogen gas is evolved. If a piece of potassium be immersed under water, an effervescence of hydrogen gas takes place; if it be thrown upon the water, the hydrogen is kindled and inflamed. Sodium, and the bases of the earths, also decompose water.
    - *b.* Water, assisted by an acid. In this case, also, hydrogen gas is evolved. Thus, iron and zinc are oxygenized by dilute sulphuric acid, and iron by muriatic acid; copper and lead by vinegar.
    - *c.* Water, assisted by chlorine. In this case no hydrogen is evolved, but muriatic acid is formed at the same time with the oxide.
    - *d.* Metallic oxides, assisted by heat. In this way organic substances are now commonly analysed by mixture with peroxide of copper, which furnishes the necessary oxygen for the perfect oxygenation of their elements.
5. Acids, with evolution of the decomposed acid.

a. Sulphuric acid, in the preparation of the sulphate of mercury.

b. Nitric or nitrous, one of the most common means of oxidizing metals, as mercury, &c.

c. Nitromuriatic acid, or aqua regia; in this case the oxygen is furnished by the nitric acid, and the oxide is dissolved in the muriatic. This compound acid is used for metals which cannot decompose water, and whose oxides are soluble only in muriatic acid, as gold and platinum.

6. Nitrates. The oxygen is in these instances furnished by the decomposition of the nitric acid; and for this purpose, a degree of heat sufficient to produce deflagration is necessary.

7. Chlorates act in the same way as the nitrates; but they are too expensive for common use.

459. The different modes of oxygenizement are intended, either,

a. To produce heat and light;

b. To obtain an oxygenized product;

1. An oxide, when the process may be termed *Oxidizement.*
2. An acid, *Acidification.*

c. To remove an oxygenizable substance.

460. Hydrogen, carbon, and nitrogen, are never, unless for experiment, oxygenized as simple substances.

461. Sulphur is converted into sulphuric acid by burning it in leaden chambers, or by deflagrating it with nitrate of potass; and phosphorus is acidified by inflammation in the atmosphere, or by nitric acid.

462. Of all the simple oxygenizable substances, the metals are most frequently combined with oxygen; and, as in consequence of this combination, they lose their metallic appearance, they were formerly said to be calcined or corroded.

463. The metals are susceptible of different degrees of oxygenixement, some of them even of acidification, and, in general, they are more oxygenized according to the rapidity of the process. When proceeding too slowly, it may be accelerated by heat; when too violent, it must be checked by diminution of temperature, as by plunging the vessel in which the operation is performed into cold water.

464. When the degree of oxygenizement is not very great, the oxide formed generally enters into combination with the acid employed, and forms a metallic salt; but when carried to its highest degree, the oxide is often insoluble in acids.

DISOXYGENIZEMENT OF METALLIC OXIDES AND ACIDS.

465. This process was formerly termed *reduction* or *revivification,* from its restoring the metals to their metallic splendour.

466. It is performed either *via sicca* or *via humida.*

467. The facility with which metals are reduced *via sicca* has been made the foundation of their classification.

I. Metals whose oxides cannot be decomposed by heat without the addition of combustible matter.

a. Metals whose existence is inferred from analogy, but whose oxides have not been reduced.

Silicium.
Zirconium.
Aluminum.
Yttrium.
Glucinum.
Magnesium.

b. Metals whose oxides are reducible by electricity, and by heat with certain combustibles.

1. Metals which decompose water at 60°.

Calcium.
Strontium.
Barium.
Lithium.
Sodium.
Potassium.

2. Metals which require to be heated to redness to enable them to decompose water.

Manganese.
Zinc.
Iron.
Tin.
Cadmium.

3. Metals which are incapable of decomposing water at any temperature.

aa. Acidifiable,

Arsenic.
Molybdenum.
Chrome.
Tungsten.
Columbium.

bb. Oxidizable,

Antimony.
Uranium.
Cerium.
Cobalt.
Titanium.
Bismuth.
Copper.
Tellurium.

II. Metals whose oxides can be reduced by heat alone.

1. Metals which are capable of absorbing oxygen from the atmosphere.

Nickel.
Lead.
Mercury.
Osmium.

2. Metals which never absorb oxygen from the atmosphere.

Silver.
Palladium.
Rhodium.
Platinum,
Gold.
Iridium.

468. In pharmacy, those metallic oxides which resist the action of heat alone, are reduced by melting them in contact with charcoal, or substances which may be charred, such as oil, fat, resin, pitch, &c. Besides the charcoal, different saline fluxes are also added to facilitate the fusion of the oxide, and to allow the globules of the reduced metal to fall through them and unite into a mass.

469. The oxide to be reduced is mixed with a sufficient quantity of any of these substances, and placed in the bottom of a crucible, which is afterwards filled up with charcoal powder, to prevent entirely the access of air. The crucible is then exposed for a length of time to a sufficiently high temperature, when a button of the metal will commonly be found in the bottom.

470. Upon the volatile metals, such as arsenic and zinc, this operation must be performed in a distilling or subliming apparatus, and the metal is condensed in the upper part, or distilled over.

471. Some metals may be also reduced *via humida* from their solutions.

a. By simple inflammables. If a piece of taffeta, moistened with a solution of gold or silver, be exposed to a stream of hydrogen, or sulphuretted hydrogen gas, the metal is revived. If a slip of charcoal be immersed in a solution of gold, and exposed to the light of the sun, or heated to 212°, it gets covered with metallic gold. If a piece of phosphorus be immersed in a solution of sulphate of copper, it gets coated with copper. In all these cases the inflammable attracts and removes the oxygen.

b. By another metal having a greater affinity for oxygen. When a plate of tin is immersed in a solution of nitro-muriate of gold, the gold is precipitated upon the tin in the form of the purple powder of Cassius. If a little mercury be placed in a dilute solution of nitrate of silver, a beautiful arborescent crystallization of silver, called *Arbor Dianæ*, is gradually formed. If a piece of zinc be suspended in a solution of sugar of lead, a fine foliated crystallization, called the Lead Tree, appears.

c. By a metallic protoxide having strong affinity for more oxygen. Gold is reduced from its solution by proto-sulphate of iron.

d. By several vegetable acids, especially oxalic acid, or binoxalate of potass, when carbonic acid is evolved by the union of the oxalic acid with the oxygen of the oxide.

e. By vegetable inflammables. Ether decomposes muriate of gold, and dissolves the metal. This solution is used for gilding steel.

f. By animal substances. Ivory decomposes a solution of nitrate of silver; and the metal, which at first appears black, becomes brilliant by rubbing.

472. The compound oxides, (vegetable and animal substances,) may be further oxygenized, by treating them with nitric acid. In this way various oxides and acids are formed, according to the nature of the oxide operated on, the quantity of the acid, and the mode of conducting the process.

473. These substances also undergo changes by gradually combining with the oxygen of the atmosphere. In some cases, this combination is attended with remarkable phenomena, which have been classed under the term *fermentation*.

474. There are many species of fermentation, some of which have scarcely been noticed, and others have been named from the products they afford.

1. The saccharine, which produces sugar.
2. The vinous, which produces wine, beer, and similar fluids.
3. The panary, which produces bread.
4. The acetous, which produces vinegar.
5. The putrefactive, which produces ammonia.

475. The same substances are sometimes capable of undergoing the first, second, fourth, and fifth; or the third, fourth, and fifth, successively, but never in a retrograde order.

476. The conditions necessary for most of them are,

1. The presence of a sufficient quantity of fermentable matter;
2. The presence of a certain proportion of water;

3. The contact of atmospheric air; and,
4. A certain temperature.

477. *The saccharine fermentation.*—The seeds of barley, when moistened with a certain quantity of water, and exposed to the contact of the atmospheric air, at a temperature of not less than 50°, swell, and shew marks of incipient vegetation, by pushing forth the radicle. If at this period the fermentation be checked, by exposing them to a considerable degree of heat, and drying them thoroughly, the insipid amylaceous matter, of which the seeds principally consisted, will be found to be changed in part into a sweet saccharine substance. The oxygen of the air, in contact with the seeds, is at the same time converted into carbonic acid gas, by combining with part of the carbon of the seeds; and there is a considerable increase of temperature in the fermenting mass, even to such a degree as sometimes to set it on fire. Similar phenomena occur in the maturation of fruits; in the cookery of some roots and fruits, and during the heating of hay, when put up too wet. Starch may be converted into sugar, by boiling it for a long time with dilute sulphuric acid.

478. *The vinous fermentation.*—The conditions necessary for the vinous fermentation, are, the presence of proper proportions of sugar, ferment, and water, and a temperature of about 70°. The contact of air is not necessary. When these circumstances exist, an intestine motion commences in the fluid; it becomes thick and muddy, it swells up, its temperature increases, and much carbonic acid gas is evolved. After a time the fermentation ceases, the feces rise to the top, or subside to the bottom, the liquor becomes clear, it has lost its saccharine taste, and assumed a new one, and its specific gravity is diminished. If the fermentation has been complete, the sugar is entirely decomposed, and the fermented liquor consists of a large proportion of water, of alcohol, of malic acid, of extract, of essential oil, and colouring matter. The substances most commonly subjected to this fermentation are must, which is the expressed juice of the grape, and which produces the best wines; the juice of the currant and gooseberry, which, with the addition of sugar, form our home-made wines; the juices of the apple and pear, which give cyder and perry; and an infusion of malt, which, when fermented with yeast, forms beer. The briskness and sparkling of some of these liquors depend on their being put into close vessels before the fermentation is

completed, by which means a portion of carbonic acid gas is retained.

479. *The acetous fermentation.*—All vinous liquors are susceptible of the acetous fermentation, provided they be exposed to the action of the atmosphere in a temperature between 70° and 90°. An intestine motion and hissing noise sensibly take place in the fluid; it becomes turbid, with filaments floating in it, and its temperature increases; it exhales a pungent acid smell, without any disengagement of carbonic acid gas. Gradually these phenomena cease; the temperature decreases, the motion subsides, and the liquor becomes clear, having deposited a sediment and red glairy matter, which adheres to the sides of the vessel. During this process, the alcohol and malic acid disappear entirely, oxygen is absorbed, and acetous acid formed.

480. *The panary and colouring fermentation*—is less understood than those already described. A paste of wheat-flour and water, exposed to a temperature of 65°, swells, emits a small quantity of gas, and acquires new properties. The gluten disappears, and the paste acquires a sour disagreeable taste. If a just proportion of this fermented paste or leaven, or, what is still better, if some barm, be formed into a paste with wheat-flour and water, the same fermentation is excited, without the disagreeable taste being produced; the gas evolved is prevented from escaping by the viscidity of the paste, which therefore swells, and if baked, forms light spongy bread.

481. *The putrefactive fermentation.*—Although vegetable substances, when they are destroyed by spontaneous decomposition, are said to putrefy, we shall consider this fermentation as belonging exclusively to animal substances, or those which contain nitrogen as an elementary principle. The essential conditions of putrefaction are humidity, and a temperature between 45° and 110°. The presence of air, and the addition of ferments, are not essential, but accelerate its progress. The smell is at first vapid and disagreeable, but afterwards insupportably fetid, although the fetor, for a time, is somewhat diminished by the mixture of an ammoniacal odour. Liquids become turbid and flocculent. Soft substances melt down into a gelatinous mass, in which there is a kind of gentle motion and swelling up, from the slow and scanty formation of elastic fluids. Solids, beside the general softening, exude a serosity of various colours, and by degrees the whole mass dissolves, the swelling ceases, the matter settles, and its colour deepens; at last its odour

becomes somewhat aromatic, its elements are finally dissipated, and there remains only a kind of fat, viscid, and still fetid mould. The products of putrefaction are carburetted, sulphuretted, and phosphuretted hydrogen gases, water, ammonia, azote, and carbonic acid. These are all dissipated in the form of gas or vapour. When in contact with air, oxygen is absorbed. Acetic acid, a fatty matter, a soap composed of this fat and ammonia, and often the nitric acid, fixed by a salifiable base, are also produced; and the ultimate remains, besides earthy salts, contain for a long time a portion of fat charry matter.

482. Destructive distillation is a species of artificial fermentation, in which the tendency of the elements of organic bodies, to form simpler modes of union, is promoted by a high temperature.

483. When a vegetable substance is subjected to the destructive distillation in a close vessel, we find remaining in the retort the earthy and saline constituents in small quantity, together with a considerable proportion of the charcoal. In the receiver are condensed water with empyreumatic oil and acetic acid, while a great quantity of carburetted hydrogen gas, impregnated with empyreumatic oil, is allowed to escape. The explanation of the change is evident. The oxygen divides itself between the hydrogen and carbon to form water and carbonic acid, or unites with both in acetic acid; the hydrogen forms water, acetic acid, oil and inflammable gas, while the carbon forms carbonic and acetic acid, empyreumatic oil and inflammable gas, and what is more than sufficient for these purposes remains fixed in the retort. This process is employed for the preparation of charcoal, of pyrolignic acid, and vegetable empyreumatic oils.

484. When animal substances containing much nitrogen is subjected to the same process, the products, on account of the difference of the elements, are somewhat different. The animal charcoal left in the retort contains more earthy constituents, and the true carbonaceous matter is more attenuated; no acetic acid is formed; but the carbonic acid is saturated with ammonia, while the empyreumatic oil is more fetid. In this way the greatest part of the ammonia for pharmaceutical purposes is got from bones, and also animal empyreumatic oils of different kinds are prepared.

485. In destructive distillation, without addition, and in common apparatus, the decomposition is not complete; some ternary combinations, as oil and acetic acid, are formed; but as the quantities of these are variable according to ac-

cidental circumstances, no certain information is afforded as to the ultimate constitution of the substances subjected to it; and the multiplied labours of Geoffroy, and the chemists of his school, are nearly useless. In modern times, however, by operating in well-contrived apparatus, exposing the subject to a sufficient degree of heat, and adding chlorate of potass, or rather peroxide of copper, to afford enough of oxygen to saturate all the bases, the elements of many organic products have been determined with the greatest exactness; as the only products that can be procured in this way are water, carbonic acid, and nitrogen, which may be separated by easy means, and thus furnish certain data.

486. Gay Lussac and Thenard have concluded, that,

a. A vegetable substance, in which the oxygen exceeds the quantity necessary to unite with the hydrogen into water, is always acid;

b. When the proportion of oxygen is less than that sufficient to convert the hydrogen into water, it is oily, resinous or alcoholic;

c. When the proportions of oxygen and hydrogen are exactly those which form water, it is neither acid nor resinous.

APPENDIX.

WEIGHTS AND MEASURES.

ENGLISH.

PRINCIPLES OF THE NEW IMPERIAL WEIGHTS AND MEASURES.

The Commissioners, appointed for the important object of introducing uniformity of weights and measures in all parts of the empire, selected, from among the various standard measures in the custody of the Clerk of the House of Commons, one to be the only standard and unit measure of extension; and lest this should be lost, they ascertained its length in proportion to the length of a pendulum vibrating seconds of mean time in the latitude of London in a vacuum at the level of the sea; and this proportion they found to be as 36 to 39.1393.

A cubic inch of distilled water, weighed in air by brass weights at 62° Fahr. and 30° Bar. is equal to 252.258 troy grains, of which 5760 are the imperial troy pound, and 7000 the avoirdupois pound.

A measure containing 10 avoirdupois pounds is the imperial standard gallon for liquid and dry goods not heaped.

For goods which may be sold heaped, the standard is a bushel, containing eighty pounds of water, being a cylindrical vessel, with a plain and even bottom, and 19 inches and a half from outside to outside, with the goods duly heaped in such bushel in the form of a cone, such cone being at least six inches high, with the outside of the bushel as its extremity. Three such bushels are a sack; twelve sacks a chaldron.

IMPERIAL STANDARD MEASURE.

By 5. Geo. IV. cap. 74, it was enacted, That from and after the 1st day of May 1825, (afterwards postponed to 1826,) the unit and only standard measure of capacity shall be the Imperial Standard Gallon, containing ten pounds avoirdupois weight of distilled water, weighed in air at 62° Fahr. and 30 inches bar.; that the quart shall be the fourth part of such gallon; the pint the eighth part; that two such gallons shall be a peck; eight a bushel; and eight bushels a quarter; or

Qr.	*Bush.*	*Peck.*	*Gall.*	*Quart.*	*Pint.*	*Cubic inches.*	*Aver. lbs.*	*Troy grs.*
1 =	8 =	32=	64 =	256 =	512 =	17745.536	=640	
	1 =	4=	8 =	32 =	64 =	2218.192	= 80	
		1=	2 =	8 =	16 =	554.548	= 20	
			1 =	4 =	8 =	277.274	= 10	= 70,000
				1 =	2 =	69.3185 =	2.5	= 17,500
					1 =	34.65925=	1.25	= 8,750

IMPERIAL STANDARD TROY WEIGHT.

By 5. George IV. cap. 74, it is enacted, That from and after the 1st day of May 1825, afterwards postponed to 1826, that the standard brass weight of One pound, Troy weight, made in 1758, and now in the custody of the Clerk of the House of Commons, shall be the unit and only standard measure of weight; and that one-twelfth part of it shall be an ounce; one-twentieth part of such ounce a pennyweight; and one twenty-fourth part of such pennyweight a grain, so that five thousand seven hundred and sixty such grains shall be a pound; and that seven thousand such grains shall be a pound avoirdupois; and one-sixteenth part of such pound avoirdupois an ounce avoirdupois; and one-sixteenth of such ounce shall be a dram, or

Gr.
24 = *Pennyweight.*
480 = 20 = *Troy Ounce.*
5760 = 240 = 12 = *Troy Pound.*

It therefore appears, that by the act, the Apothecaries weight, already in general use, and the Imperial Standard Troy weight, coincide exactly as to pounds, ounces and grains; but that the Troy dram and scruple, so constantly employed by apothecaries, are not recognised by the Legislature; while the Troy pennyweight is not employed by the apothecary; but these slight deviations would lead to no inconvenience, if the Avoirdupois weight were entirely abolished, which does not seem to be the case, and therefore there are still two different pounds and ounces; and the only dram recognised by the Legislature is the Avoirdupois dram, very different from the Apothecaries dram.

The *pound* Avoirdupois weight contains 7000 grains; the Imperial Standard Troy and the Apothecaries weight 5760.

The *ounce* Imperial Standard Troy and Apothecary contains 480 grains; Avoirdupois 437.5.

The *dram* Apothecary contains 60 grains; Avoirdupois 27.34375.

APOTHECARIES WEIGHT.

Pound.		*Ounces.*		*Drams.*		*Scruples.*		*Grains.*		*Grammes.*
℔ 1	=	12	=	96	=	288	=	5760	=	372.96
		℥ 1	=	8	=	24	=	480	=	31.08
				ʒ 1	=	3	=	60	=	3.885
						℈ 1	=	20	=	1.295
								gr. 1	=	0.06475

AVOIRDUPOIS WEIGHT.

Pounds.		*Ounces.*		*Drams.*		*Troy Grains.*		*Grammes.*
1	=	16	=	256	=	7000	=	423.25
		1	=	16	=	437.5	=	28.32
				1	=	27.34375	=	1.81

SCOTCH TROY WEIGHT.

Standard Troy Grains.								
29.75	=	*Drop.*						
476.	=	16	=	*Ounce.*				
7616.	=	256	=	16	=	*Pound.*		
121896.	=	4096	=	256	=	16	=	1 *Stone.*

SCOTCH TRON WEIGHT.

Standard Troy Grains.								
29.75	=	*Drop.*						
476.	=	16	=	*Ounce.*				
9520.	=	320	=	20	=	*Pound.*		
152320.	=	5210	=	320	=	16	=	1 *Stone.*

Table for converting Ounces, Drams, and Grains Troy into Decimals of the Apothecaries Pound.

Grains.		*lbs. Troy.*	*Drams.*		*lbs. Troy.*	*Oz.*		*lbs. Troy.*
1	=	.000173611	1	=	.0104166	1	=	.0833
2	=	.000347222	2	=	0208333	2	=	.1666
3	=	.000520833	3	=	.0312500	3	=	.2500
4	=	.000694444	4	=	.0416666	4	=	.3333
5	=	.000868055	5	=	.0520833	5	=	.4166
6	=	.001041666	6	=	.0625000	6	=	.5000
7	=	.001215277	7	=	.0729166	7	=	.5833
8	=	.001388888				8	=	.6666
9	=	.001562500				9	=	.7500
						10	=	.8333
						11	=	.9166

Table for converting Decimals of the Apothecaries Pound into Apothecaries Ounces, Drams, and Grains.

lb.	*oz.*	*dr.*	*grs.*	*lb.*	*oz.*	*dr.*	*grs.*	*lb.*	*grains.*
.1	1	1	36	.01	0	0	57.6	.001	5.76
.2	2	3	12	.02	0	1	55.2	.002	11.52
.3	3	4	48	.03	0	2	52.8	.003	17.28
.4	4	6	24	.04	0	3	50.4	.004	23.04
.5	6	0	0	.05	0	4	48.0	.005	28.80
.6	7	1	36	.06	0	5	45.6	.006	34.56
.7	8	3	12	.07	0	6	43.2	.007	40.32
.8	9	4	48	.08	0	7	40.8	.008	46.08
.9	10	6	24	.09	0	8	38.4	.009	51.84

Table for converting Avoirdupois Ounces into Decimals of the Avoirdupois Pound.

oz. Av.	*lbs. Av.*	*oz. Av.*	*lbs. Av.*
.25	.015625	8.00	.5000
.50	.03125	9.00	.5625
1.00	.0625	10.00	.6250
2.00	.1250	11.00	.6875
3.00	.1875	12.00	.7500
4.00	.2500	13.00	.8125
5.00	.3125	14.00	.8750
6.00	.3750	15.00	.9375
7.00	.4375		

Table for converting Decimals of the Avoirdupois Pound into Avoirdupois Ounces and Decimals.

lbs. Av.	*oz. Av.*	*lbs. Av.*	*oz. Av.*
.1	1.6	.01	.16
.2	3.2	.02	.32
.3	4.8	.03	.48
.4	6.4	.04	.64
.5	8.0	.05	.80
.6	9.6	.06	.96
.7	11.2	.07	1.12
.8	12.8	.08	1.28
.9	14.44	.09	1.44

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Table for converting Apothecaries Pounds into their equivalent Avoirdupois Pounds and Decimals.

lbs. Troy.		lbs. Avoirdup.	lbs. Troy.		lbs. Avoirdup.
1	=	0.82285714	6	=	4.93714285
2	=	1.64571428	7	=	5.76000000
3	=	2.46857142	8	=	6.58285714
4	=	3.29142857	9	=	7.40571428
5	=	4.11428571			

Table for converting Apothecaries Weight into Avoirdupois Weight.

TROY.	AVOIRDUPOIS.		TROY.	AVOIRDUPOIS.	
dr.	dr.	gr.	dr.	dr.	gr.
1 =	2 :	5.3125	5 =	10 :	26.5625
2 =	4 :	10.625	6 =	13 :	4.53125
3 =	6 :	15.9375	7 =	15 :	9.84375
4 =	8 :	21.25	8 =	17 :	15.15625

TROY.	AVOIRDUPOIS.		TROY.	AVOIRDUPOIS.	
oz.	oz.	gr.	oz.	oz.	gr.
1 =	1 :	42.5	7 =	7 :	297.5
2 =	2 :	85.	8 =	8 :	340.
3 =	3 :	127.5	9 =	9 :	382.5
4 =	4 :	170.	10 =	10 :	425.
5 =	5 :	212.5	11 =	12 :	30.
6 =	6 :	255.	10 =	13 :	72.5

TROY.	AVOIRDUPOIS.			TROY.	AVOIRDUPOIS.		
lb.	lb.	oz.	gr.	lb.	lb.	oz.	gr.
1 =	0	13	72.5	17 =	13	15	359.5
2 =	1	10	145	18 =	14	12	430
3 =	2	7	217.5	19 =	15	10	65
4 =	3	4	290	20 =	16	7	137.5
5 =	4	1	362.5	30 =	24	10	425
6 =	4	14	435	40 =	32	14	275
7 =	5	12	70	50 =	41	2	125
8 =	6	9	142.5	60 =	49	5	412.5
9 =	7	6	215	70 =	57	9	262.5
10 =	8	3	287.5	80 =	65	13	112.5
11 =	8	0	360	90 =	74	0	400
12 =	9	13	432.5	100 =	82	4	250
13 =	10	11	67.5	200 =	164	9	62.5
14 =	11	8	140	300 =	246	13	312.5
15 =	12	5	212.5	400 =	293	2	125
16 =	13	2	285	500 =	411	6	375

Table for converting Avoirdupois Pounds into their equivalent Apothecaries Pounds and Decimals.

lbs. Avoird.		*lbs. Troy.*	*lbs. Avoird.*		*lbs. Troy.*
1	=	$1.21527\dot{7}$	6	=	$7.29166\dot{6}$
2	=	$2.43055\dot{5}$	7	=	$8.50694\dot{4}$
3	=	$3.64583\dot{3}$	8	=	$9.72222\dot{2}$
4	=	$4.06111\dot{1}$	9	=	$10.93750\dot{0}$
5	=	$6.07638\dot{8}$			

Table for converting Avoirdupois Weight into Apothecaries Weight.

AVOIRDUPOIS.		TROY.		AVOIRDUPOIS.		TROY.		
dr.		*dr.*	*gr.*	*oz.*		*oz.*	*dr.*	*gr.*
1	=	0	27.34375	1	=	0	7	17.5
2	=	0	54.68750	2	=	1	6	35
3	=	1	22.03125	3	=	2	5	52.5
4	=	1	49.37500	4	=	3	5	10
5	=	2	16.71175	5	=	4	4	27.5
6	=	2	44.06250	6	=	5	3	55
7	=	3	11.40625	7	=	6	3	2.5
8	=	3	38.75000	8	=	7	2	20
9	=	4	6.09375	9	=	8	1	37.5
10	=	4	33.43750	10	=	9	0	55
11	=	5	00.78125	11	=	10	0	22.5
12	=	5	28.13500	12	=	10	7	50
13	=	5	55.46875	13	=	11	6	57.5
14	=	6	22.81250	14	=	12	6	5
15	=	6	50.15625	15	=	13	5	22.5
16	=	7	17.50000	16	=	14	4	40

AVOIRDUPOIS.		TROY.				AVOIRDUPOIS.		TROY.			
lb.		*lb.*	*oz.*	*dr.*	*gr.*	*lb.*		*lb.*	*oz.*	*dr.*	*gr.*
1	=	1	2	4	40	17	=	20	7	7	20
2	=	2	5	1	20	18	=	21	10	4	00
3	=	3	7	6	00	19	=	23	1	0	40
4	=	4	10	2	40	20	=	24	3	5	20
5	=	6	0	7	20	30	=	36	5	4	00
6	=	7	3	4	00	40	=	48	7	2	40
7	=	8	6	0	40	50	=	60	9	1	20
8	=	9	8	5	20	60	=	72	11	0	00
9	=	10	11	2	00	70	=	85	0	6	40
10	=	12	1	6	40	80	=	97	2	5	20
11	=	13	4	3	20	90	=	109	4	4	00
12	=	14	7	0	00	100	=	121	6	2	40
13	=	15	9	4	40	200	=	243	0	5	20
14	=	17	0	1	20	300	=	364	7	0	00
15	=	18	2	6	00	400	=	486	1	2	40
16	=	19	5	2	40	500	=	607	7	5	20

LONG MEASURE.

Metres.	*Barleycorn.*	*Inch.*	*Foot.*	*Yard.*	*Pole or Perch.*	*Furlong.*	*Mile.*
0.0085	1						
0.0254	3	1					
0.3048	36	12	1				
0.9144	108	36	3	1			
5.0291	594	198	16½	5½	1		
201.1632	23760	7920	660	220	40	1	
1609.3059	190080	63360	5280	1760	320	8	1

COMPARISON OF MEASURES.

Gallon, imperial standard, contains 10 lbs. avoirdupois of distilled water, or 70,000 troy grains, or 277.274 cubic inches; apothecaries and former wine measure 58,443 troy grains, or 231 cubic inches, the ratio being very nearly as 6 to 5, or, more accurately, as 1 to 0.833111.

Pint, imperial standard, contains 17500 troy grains, or 34.65925 cubic inches; apothecaries measure 7305 troy grains, or 28.875 cubic inches, the ratio being the same as in the gallon.

MEASURE, LONDON PHARMACOPŒIA.

Gal.	*Pints.*	*Fluidoun.*	*Fluidr.*	*Minims.*	*Troy Gr.*	*Cub. Inch.*	*Litres.*
1	8	128	1024	61440	58337.80	231	3.78515
	O1	16	128	7680	7292.30	28.875	0.47398
		f℥1	8	480	455.77	1.8047	0.02957
			fʒ1	60	56.97	0.2256	0.00396
				♏ 1	0.95	0.00374	0.000066

FORMER ENGLISH WINE MEASURE.

Pipe or Butt.	*Punch*	*Hogsh.*	*Tierce.*	*Bar.*	*Rundlet.*	*Gallon.*	*Quart.*	*Pint.*	*Quarterns.*	*Cub. Inch.*
2	3	4	6	8	14	252	1008	2016	8064	58212
1	1½	2	3	4	7	126	504	1008	4032	29106
	1	1⅓	2	2⅔	$5\frac{2}{9}$	84	336	672	2688	19404
		1	1½	2	3½	63	252	504	2016	14553
			1	1⅓	2⅓	42	168	336	1344	9702
				1	1¾	31½	126	252	1008	7276.5
					1	18	72	144	576	4158.
						1	4	8	32	231.
							1	2	8	57.75
								1	4	28.875
									1	7.219

FORMER ENGLISH ALE MEASURE.

Hogsh.	*Barrel.*	*Kilderk.*	*Firkin.*	*Gallon.*	*Quart.*	*Pint.*	*Cub. Inch.*
1	= 1½	= 3	= 6	= 51	= 204	= 408	= 14382
	1	= 2	= 4	= 34	= 136	= 272	= 9588
		1	= 2	= 17	= 68	= 136	= 4794
			1	= 8½	= 34	= 68	= 2397
				1	= 4	= 8	= 282
					1	= 2	= 70½
						1	= 35¼

In London, 36 gallons were allowed to the barrel of beer, and 32 gallons of ale.

FORMER SCOTS LIQUID MEASURE.

Bar.	*Gal.*	*Quart.*	*Pint.*	*Choppin.*	*Mutchkin.*	*Gills.*	*Cub. Inch.*
1	= 8	= 32	= 64	= 128	= 256	= 1024	= 6720
	1	= 4	= 8	= 16	= 32	= 128	= 840
		1	= 2	= 4	= 8	= 32	= 210
			1	= 2	= 4	= 16	= 105
				1	= 2	= 8	= 52.5
					1	= 4	= 26.25
						1	= 6.56

	Cubic Inches.	*Apothecaries Pint.*	*Imperial Pint.*
1 lb. Troy, - -	22.8157	= 0.78987	= 0.6583
1 lb. Avoirdupois, -	27.7274	= 0.95992	= 0.7999

Table for converting Apothecaries Pints of Water into their equivalent Apothecary Pounds and Decimals and Avoirdupois Decimals.

Pints.	*lbs. Troy.*	*lbs. Troy. oz. dr. grs.*	*lbs. Avoirdupois.*
1	= 1.2659	= 1 : 3 : 1 : 32.3	= 1.04175
2	= 2.5319	= 2 : 6 : 3 : 4.6	= 2.08351
3	= 3.7979	= 3 : 9 : 4 : 36.9	= 3.12527
4	= 5.0639	= 5 : 0 : 6 : 9.2	= 4.16728
5	= 6.3299	= 6 : 3 : 7 : 41.5	= 5.20878
6	= 7.5958	= 7 : 7 : 1 : 13.8	= 6.25054
7	= 8.8618	= 8 : 10 : 2 : 46.1	= 7.29230
8	= 10.1277	= 10 : 1 : 4 : 18.4	= 8.33406
9	= 11.3937	= 11 : 4 : 5 : 50.7	9.37581

Table for converting Apothecary or English Ale Gallons into Imperial Standard Measure.

Apothecary.		*Imperial.*	*Ale.*		*Imperial.*
1000	=	833.11	1000	=	1017.04
2000	=	1666.22	2000	=	2034.09
3000	=	2499.33	3000	=	3051.13
4000	=	3332.44	4000	=	4068.18
5000	=	4165.56	5000	=	5085.22
6000	=	4998.67	6000	=	6102.27
7000	=	5831.78	7000	=	7119.31
8000	=	6664.89	8000	=	8136.36
9000	=	7498.00	9000	=	9153.40
10000	=	8331.11	10000	=	10170.45

EXAMPLE.—*Suppose we wish to know how many Imperial Gallons are equal to* 9643 *Apothecary.*

9000 = 7498.00
600 = 499.867
40 = 33.3244
3 = 2.49933

Apothecary 9643 = 8033.69073 Imperial.

Table for converting Imperial Standard Measure into Apothecary.

Imperial.		*Apothecary.*	*Imperial.*		*Apothecary.*
1	=	1.2	10	=	12
2	=	2.4	20	=	24
3	=	3.6	30	=	36
4	=	4.8	40	=	48
5	=	6.0	50	=	60
6	=	7.2	60	=	72
7	=	8.4	70	=	84
8	=	9.6	80	=	96
9	=	10.8	100	=	108

Table for converting Cubic Inches of Water (at 62° Fahr. and 30. Bar.) into their equivalents in Apothecary Weight.

Cub. Inch of Water.		*Troy grs.*		*oz.*	*dram.*	*grs.*
1	weighs	252.458	=	0 :	4 :	12.458
2	——	504.916	=	1 :	0 :	24.916
3	——	757.374	=	1 :	4 :	37.374
4	——	1009.832	=	2 :	0 :	49.832
5	——	1262.296	=	2 :	5 :	2.296
6	——	1514.748	=	3 :	1 :	14.748
7	——	1767.206	=	3 :	5 :	27.206
8	——	2019.064	=	4 :	1 :	39.664
9	——	2272.128	=	4 :	5 :	52.128
1728 (1 cub. foot)		436247.424	=	908 :	6 :	47.424

Table for converting the Ounce Measure used by Dr Priestley into Cubical Inches.

Ounce Measures.	*French Cubical Inches.*	*English Cubical Inches.*
1	1.567	1.898
2	3.134	3.796
3	4.701	5.694
4	6.268	7.592
5	7.835	9.490
6	9.402	11.388
7	10.969	13.286
8	12.536	15.184
9	14.103	17.082
10	15.670	18.980
20	31.340	37.960
30	47.010	56.940
40	62.680	75.920
50	78.350	94.900
60	94.020	113.880
70	109.690	132.860
80	125.360	151.840
90	141.030	170.820
100	156.700	189.800
1000	1567.000	1898.000

Correspondence between English and Foreign Weights and Measures.

FRENCH MERIDIONAL OR DECIMAL WEIGHT.

‘ To employ, as the fundamental unity of all measures, a type taken ‘ from nature itself, a type as unchangeable as the globe on which we ‘ dwell,—to propose a metrical system, of which all the parts are intimately connected together, and of which the multiples and subdivisions follow a natural progression, simple, and easy to comprehend : ‘ —this is most assuredly a beautiful, great, and sublime idea, worthy ‘ of the enlightened age in which we live.’

Such were the ideas which influenced the French National Institute, when they chose, as the base of the whole metrical system, the fourth part of the terrestrial meridian, between the equator and the north pole. They adopted the ten millionth part of this arc for the unity of measure, which they denominated *metre*, and applied it both to superficial and solid measure, taking for the unity of the former, *are*, the square of the decuple, and for that of the latter, *litre*, the cube of the tenth part of the metre. They chose for the unity of weight, *gramme*, the quantity of distilled water which the same tube contains when reduced to a constant state presented by nature itself; and, lastly, they decided, that the multiples and submultiples of each kind of measure, whether of weight, capacity, or length, should be always taken in the decimal progression, as being the most simple, the most natural, and the most easy for calculation, according to the system of numeration which all Europe has employed for centuries, and they used the prefixes, *deca*, *hecto*, *kilo*, and *myria*, taken from the Greek numerals, to express the multiplication of the integer by 10, 100, 1000, and 10,000 respectively, and *deci*, *centi*, *milli*, taken from the Latin numerals, to express its division.

By a careful measurement of the arc between Dunkirk and Mountjoy, they found the length of the metre to be equal to 443.296 lines of the toise. The cubic decimetre of distilled water, taken at its maximum of density and weight *in vacuo*, that is, the unity of weight, was found to be 18827.15 grains of the pile of Charlemagne.

Basis of Comparison between English and French Weights and Measures.

The *metre* at 32° = 39.371 English inches at 62°.
The square metre = 1550.075641 English square inches.
The square decimetre = 15.50075 English square inches.
100 *ares* or square decametres = 2 English acres nearly.

Cub. feet. cub. inch.
The cubic metre = 61028.028 English cubic inches = 355 + 48.028.
The cubic decimetre, or *litre* = 61.028 English cubic inches.
Equal to the bulk of a kilogramme of water.

Troy gr.
The gramme or weight of a cubic centimetre of water = 15.44402 *.

MEASURES OF LENGTH:

The Metre being at 32°, and the foot at 62°.

		English inches.		*Mil.*	*Fur.*	*Yards.*	*Feet.*	*Inch.*
Millimetre	=	.03937						
Centimetre	=	.39371						
Decimetre	=	3.93710						
Metre	=	39.37100	=	0	0	1	0	3.7
Decametre	=	393.71000	=	0	0	10	2	9.7
Hecatometre	=	3937.10000	=	0	0	109	1	1
Kilometre	=	39371.00000	=	0	4	213	1	10.2
Myriametre	=	393710.00000	=	6	1	156	0	6

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* It is upon this basis that all the following tables have been constructed; but it has been recently ascertained, at the London Mint, from attested standards sent by Mr Morier, our Consul-General at Paris, and by the agreement of several other standards sent by other British Consuls in France, that the kilogramme is only 15,434, instead of 15,444 troy grains, and that the French weight has been overrated $\frac{1}{1544}$. I have retained the calculations formerly made; but for the important effects of the error in regard to money transactions, the reader is referred to page 140 of the first volume of Kelly's Universal Cambist, edit. 1821.

Metre.		*Eng. feet.*		*Inches.*
1	=	3	:	3.371
2	=	6	:	6.742
3	=	9	:	10.113
4	=	13	:	1.484
5	=	16	:	4.855
6	=	19	:	8.226
7	=	22	:	11.597
8	=	26	:	2.968
9	=	29	:	6.339

Decimetre.		*Eng. inches.*
1	=	3.9731
2	=	7.8742
3	=	11.8113
4	=	15.7484
5	=	19.6855
6	=	23.6226
7	=	27.5597
8	=	31.4968
9	=	35.4339

MEASURES OF CAPACITY.

		English cubic inches.			
Millilitre	=	.06103	=	16.3 ♏.	Apothecary.
Centilitre	=	.61028	=	2.705 fldr.	
Decilitre	=	6.10280	=	3.381 floz.	
Litre	=	61.02800	=	2.113 octar.	
Decalitre	=	610.28000	=	2.642 galls.	
Hecatolitre	=	6102.80000	=	22.01 gallons.	Imperial.
Kilolitre	=	61028.00000	=	27.51 bushels.	
Myrialitre	=	610280.00000	=	34.39 quarters.	

Litre.		*Eng. cub. inch.*		*Imperial pints.*		*Wine pints.*		*Oz. Troy of water.*
1	=	61.028	=	1.7608	=	2.11353	=	31.104
2	=	122.056	=	3.5216	=	4.22706	=	64.208
3	=	183.084	=	5.2822	=	6.34059	=	96.312
4	=	244.112	=	7.0430	=	8.45412	=	128.416
5	=	305.140	=	8.8038	=	10.56765	=	160.520
6	=	366.168	=	10.5646	=	12.68118	=	192.624
7	=	427.196	=	12.3253	=	14.79471	=	224.728
8	=	488.224	=	14.0861	=	16.90824	=	256.832
9	=	549.252	=	15.8469	=	19.02177	=	288.936

MEASURES OF WEIGHT.

		English grains.		TROY.			
				Pounds.	*Oun.*	*Dram.*	*Grains.*
Milligramme	=	.0154					
Centigramme	=	.1544					
Decigramme	=	1.5444					
Gramme	=	15.4440					
Decagramme	=	154.4402	=	0	0	2	344
Hecatogramme	=	1544.4023	=	0	3	0	44
Kilogramme	=	15444.0234	=	2	8	1	24
Myriagramme	=	154440.2344	=	26	9	6	0

Gram.		*Troy grs.*	*Deca-gram.*		*Troy dram.*	*grs.*	*Hecto-gram.*		*Troy oz.*		*Avoird. oz.*
1.	=	15.444	1.	=	2 :	34.44	1.	=	3.2175	=	3.5279
2.	=	30.888	2.	=	5 :	8.88	2.	=	6.4350	=	7.0558
3.	=	46.332	3.	=	7 :	43.32	3.	=	9.6525	=	10.5837
4.	=	61.776	4.	=	10 :	17.76	4.	=	12.8700	=	14.1116
5.	=	77.220	5.	=	12 :	52.20	5.	=	16.0875	=	17.6395
6.	=	92.664	6.	=	15 :	26.64	6.	=	19.3050	=	21.1674
7.	=	108.108	7.	=	18 :	1.08	7.	=	22.5295	=	24.6953
8.	=	123.552	8.	=	20 :	35.52	8.	=	25.7400	=	28.2232
9.	=	138.996	9.	=	23 :	9.96	9.	=	28.9575	=	31.7511

The decimal progression of all the French weights and measures renders it only necessary to change the decimal point in order to convert one into the equivalent of any other of the same species, and numerically the same, but of a different denomination. Thus, as 9 litres are equal to 15.5817 ale pints, 9 hectolitres will be equal to 1558.17 ale pints; and so of the rest.

Weights and Measures used in France before the Revolution.

DIVISION OF FRENCH WEIGHTS.

	Pound.		*Ounces.*		*Gros.*		*Deniers.*		*Grains.*		*Troy grs.*
Poids de Marc	1.2	=	16	=	128	=	384	=	9216	=	7561
Apothecary	1.5	=	12	=	96	=	288	=	6912	=	5670.5
Marc	1	=	8	=	84	=	142	=	4808	=	3780.5
			1	=	8	=	24	=	576	=	472.5
					1	=	3	=	72	=	59.1
							1	=	24	=	19.7
									1	=	0.8

		Troy grains.		
The French pound	=	7561	=	1.31268 lb. troy.
——— ounce	=	472.5625	=	0.984504 oz. troy.
——— gros	=	59.0703125	=	0.984504 dram.
——— grain	=	0.820421		

The English troy pound of 12 ounces	=	7021	Paris grains.
The Troy ounce - -	=	585.083	
The dram of 60 grains -	=	73.135	
The pennyweight or denier of 24 grains	=	29.254	
The scruple of 20 grains -	=	24.378	
The grain - - -	=	1.219	
The avoirdupois pound of 16 ounces, or 7000 troy grains,	=	8532.5	Paris grains.
The ounce - - -	=	533.625	

To reduce Paris grains to English grains, divide by English grains to Paris grains, multiply by	1.2189
Paris ounces to English troy ounces, divide by English troy ounces to Paris ounces, multiply by	1.015734
Pound (Poids de Marc) to troy pound, multiply by Troy pound to pound Poids de Marc, divide by	1.31268

Table shewing the Comparison between English and French Weights (Poids de Marc.)

English Grs.		*French Grs.*	*English Grs.*		*French Grs.*
1	=	1.2189	9	=	10.9704
2	=	2.4378	10	=	12.1890
3	=	3.6568	20	=	24.378
4	=	4.8757	30	=	36.568
5	=	6.0947	40	=	48.757
6	=	7.3136	50	=	60.947
7	=	8.5325	60	=	73.136

French Grs.		*Troy Grs.*	*French Grs.*		*Troy Grs.*
1	=	0.820421	10	=	8.20421
2	=	1.640842	20	=	16.40842
3	=	2.461263	30	=	24.61263
4	=	3.281684	40	=	32.81684
5	=	4.102105	50	=	41.02105
6	=	4.922526	60	=	49.22526
7	=	5.742947	70	=	57.42947
8	=	6.563368	72	=	59.070312
9	=	7.383789			

Gros.		*Drs.*	*Grs.*	*Gros.*		*Drs.*	*Grs.*
1	=	0 :	59.07	5	=	4 :	55.35
2	=	1 :	58.14	6	=	5 :	54.42
3	=	2 :	57.21	7	=	6 :	53.49
4	=	3 :	56.28				

Fr.oz.		*Troy oz.*	*Drs.*	*Grs.*	*Fr.oz.*		*Troy oz.*	*Drs.*	*Grs.*
1	=	0 :	7 :	52.56	9	=	8 :	6 :	53.04
2	=	1 :	7 :	45.12	10	=	9 :	6 :	45.60
3	=	2 :	7 :	37.68	11	=	10 :	6 :	38.16
4	=	3 :	7 :	30.24	12	=	11 :	6 :	30.72
5	=	4 :	7 :	22.80	13	=	12 :	6 :	23.28
6	=	5 :	7 :	15.36	14	=	13 :	6 :	15.84
7	=	6 :	7 :	7.92	15	=	14 :	6 :	8.40
8	=	7 :	7 :	0.48					

Fr. pounds.		*Tr. oz.*	*dr.*	*grs.*	*Fr. pounds.*		*Tr. oz.*	*dr.*	*grs.*
1	=	15	6	1	6	=	94	4	6
2	=	31	4	2	7	=	110	2	7
3	=	47	2	3	8	=	126	0	8
4	=	63	0	4	9	=	141	6	9
5	=	78	6	5					

LONG MEASURE.

		French Inches.				
		feet.	*inches.*	*lines.*		*English Inches.*
The French ell, *Aune*	=	3	7	1.05	=	46.69
The half toise	=	3			=	38.355

		English Foot.		
The foot	=	1.0654167	=	12.785
The inch			=	1.0654
The line				0.0888

		French Foot.		*French Inches.*
The English foot	=	0.9386	=	11.2632
The inch			=	0.9386
The line			=	00.7823

To reduce French feet or inches to English feet or inches, multiply by 1.0654167, or divide by 0.9386.

To reduce English long measure to French, multiply by 0.9386, or divide by 1.0654167.

Tables expressing the value of French feet and inches in English Measure.

French feet.		*English inches.*	*Fr. feet or in.*		*Eng. feet or in.*
1	=	12.785	1	=	1.0654 +
2	=	25.570	2	=	2.1308
3	=	38.355	3	=	3.1962
4	=	51.140	4	=	4.2616
5	=	63.925	5	=	5.3270
6	=	76.710	6	=	6,3925
7	=	89.495	7	=	7.4579
8	=	102.280	8	=	8.5233
9	=	115.065	9	=	9.5887
10	=	127.850	10	=	10.6541
			11	=	11.7195
			12	=	12.7850

FOREIGN WEIGHTS.

It would be out of place here to notice all the varieties of weights and measures used in other countries, which also differ for different commodities. In general, the apothecaries weight differs from that in common use, and is differently divided; but in writings, which treat expressly of weights and measures, the apothecaries weight is not often specified. In many places of Germany, the apothecaries pound is two thirds of that in common use, and contains 12 ounces of the same weight, of which the civil weight contains 16.

Most commonly the apothecaries weight is divided as our troy weight, or the ounce contains 480, the dram 60, and the scruple 20, of the respective grains; but in other cases, the ounce contains 576, the dram 72, and the scruple 24 grains, as in the French Poids de Marc. This division is used in Spain, Portugal, and some states of Italy and Switzerland, as well as in France. This is to be attended to, because the proportions between the grains and the ounce, drachm, and scruple differ, which, on some occasions, leads to chemical errors. Thus, Coindet's Tincture of Iodine, for which he orders 48 grains to be dissolved in an ounce of rectified spirit, can be prepared according to the *Poids de Marc*, but not according to troy weight; the iodine amounting to $\frac{1}{12}$ of the spirit in the one case, and $\frac{1}{10}$ in the other, which is a larger proportion than it can dissolve.

Number of Marcs or Pounds in common use, which are equivalent to 100 *lbs. British (Nelkenbrecher and Otto.)*

	Avoirdupois.	*Imperial Troy.*
Berlin marc,		159.589
Cologne marc,		159.555
Vienna poids de marc,		132.952
Swedish iron marc,	133.356	109.720
Breslau pound,	111.920	92.082
Petersburgh,	110.890	91.234
Dantzic,	104.160	85.698
Leipsig,	97.197	79.823
Frankfort, light,	96.931	79.751
Berlin,	96.785	
Hamburgh,	93.640	77.043
Augsburgh,	92.358	75.988
Amsterdam,	91.819	75.544
Copenhagen,	90.082	74.727
Frankfort, heavy,	89.754	73.845
Nuremberg,	88.869	73.117
Vienna,	80.981	

DIVISION OF COLOGNE CIVIL WEIGHT.

Marc.	*Oz.*	*Loth.*	*Drs.*	*Pwts.*	*Hellers.*	*As.*	*Eschen.*	*Grs.*	*St. parts.*
1	8	16	64	256	512	1792	4352	6144	65536
	1	2	8	32	64	224	544	768	8192
		1	4	16	32	112	272	384	4096
			1	4	8	28	68	96	1024
				1	2	7	17	24	256

Table of some Foreign Apothecaries weight from Meissner, Nelkenbrecher and Otto, in Milligrammes.

	Pound.	*Ounce.*	*Drachm.*	*Scruple.*	*Grain.*
Amsterdam wholesale,	470401.00				
———— retail,....	369003.30	30750.27	3843.78	1281.26	64.06
Austrian, ...	402009.00	35000.75	4375.09	1458.36	72.92
English, ...	373135.	31094.61	3886.83	1295.61	64.28
Bavarian since 1811,...	360000.	30000.	3750.	1250.	62.5
———— before 1811,	357712.5				
German, Prussian, Russian, Danish,	357663.9	29805.32	3725.66	1241.88	62.09
Swedish, ...	356318.70	29693.23	3711.65	1237.22	61.86
Spanish, ...	345027.60	28752.30	3594.04	1198.01	59.90
Venetian, ...	302025.30	25168.77	3146.09	1048.69	52.43
Turin, ...	307514.				
Berne,...................	356658.				
Florence,................	339515.				
Turkey, (Oka of 400 druna,)............	1275656.				

NUREMBERG OR GERMAN APOTHECARIES WEIGHT.

Pound.	*Ounces.*	*Drachms.*	*Scruples.*	*Grains.*	*Troy grs.*	*Grammes.*
1	12	96	288	5760	5388	357664
	1	8	24	480	460.5	29805
		1	3	60	57.5	3725
			1	20	19.2	1242
				1	0.96	62

Table shewing the Comparison between Grammes and Troy, French, and Nuremberg Apothecary Grains.

Gramme.		*Troy.*		*Poids de Marc.*		*Nuremberg.*
1	=	15.444	=	18.883	=	16.128
2	=	30.888	=	37.766	=	32.256
3	=	46.332	=	56.648	=	48.384
4	=	61.776	=	75.530	=	64.512
5	=	77.220	=	94.413	=	80.641
6	=	92.664	=	113.296	=	96.769
7	=	108.108	=	132.179	=	112.897
8	=	123.552	=	151.062	=	129.026
9	=	138.996	=	169.944	=	145.154
10	=	154.440	=	188.827	=	161.282

Swedish Weights and Measures, used by Bergman and Scheele.

The Swedish pound, which is divided like the English Apothecary, or troy pound, weighs 6556 grains troy.

The kanne of pure water, according to Bergman, weighs 42250 Swedish grains, and occupies 100 Swedish cubical inches. Hence the kanne of pure water weighs 48083.72 English troy grains, or is equal to 189.9413 English cubic inches; and the Swedish longitudinal inch is equal to 1.24 English longitudinal inches.

Table of the Weights used by the Native Druggists in the Lower Hindoostan, (Dr Ainslie.)

Grains of Paddy, Rice dried in the husk.
16 = 1 *Gold Fanam.*
168 = 10½ = 1 *Star Pagoda.*
1680 = 105 = 10 = 1 *Pollam.*
42000 = 2575 = 250 = 25 = 1 *Seer.*
64320 = 4020 = 400 = 40 = 1⅗ = 1 *Viss.*
514560 = 32160 = 3200 = 320 = 12⅕ = 8 = 1 *Maund.*
10291200 = 64320 = 64000 = 6400 = 244 = 160 = 20 = 1 *Parum.*

Two grains and a half of dried paddy are reckoned equal to one grain of troy weight; 5 grains troy to one gold fanam; and a star pagoda to 2 scruples and 22 grains troy. A parum or candy weighs 500 lb. avoirdupois.

ANCIENT ROMAN LIQUID MEASURE *.

Congius.	*Sextarius.*	*Hemina.*	*Acetabulum.*	*Cyathus.*	*Uncia*	*Ligula or Cochleare.*	*Denarius.*	*Sextans or Obolus.*	*Chalcoi.*
1	16	12	48	72	96	288	720	4320	43200
	1	2	8	12	16	48	120	720	7200
		1	4	6	8	24	60	360	3600
			1	1½	2	6	15	90	900
				1	1⅓	4	10	60	600
					1	3	7	42	420
						1	2½	15	150
							1	6	60
								1	10

The sextarius is 36.94 English cubic inches; the urna contains 4, the amphora 8, and the dolium 160 congii.

ANCIENT ROMAN WEIGHTS.

Siliquæ.
3 = 1 *Simplium.*
6 = 2 = 1 *Scrupulum.*
18 = 6 = 3 = 1 *Denarius of Nero.*
21 = 7 = 3½ = 1⅙ = 1 *Denarius of Papyrius.*
24 = 8 = 4 = 1⅓ = 1⅙ = 1 *Sextula.*
36 = 12 = 6 = 2 = 1¾ = 1½ = 1 *Sicilicum.*
48 = 16 = 8 = 2⅔ = 2⅓ = 2 = 1⅓ = 1 *Duella.*
144 = 48 = 24 = 8 = 7 = 6 = 4 = 3 = 1 *Uncia.*
1728 = 576 = 288 = 96 = 84 = 72 = 48 = 36 = 12 = 1 *Libra.*

Authors differ as to the comparison of these ancient and modern weights. The following numbers are troy grains:

	Den. Nero.	*Den. of Pap.*	*Uncia.*	*Libra.*
Arbuthnott,	-	62.4	437.2	5246.4
Christiani,	51.9		415.1	4981.2
Paucton,	53.9	61.6	431.2	5174.4

ANCIENT GREEK LIQUID MEASURES.

Keramion or Metretes.	*Amphoreus.*	*Chous.*	*Xestes.*	*Cotylus.*	*Oxybathon.*	*Cyathus.*	*Concha.*	*Mystrum.*	*Chema.*	*Cochleare.*
1	2	12	72	144	576	864	1728	3456	4320	8640
	1	6	36	72	288	432	864	1728	2160	4320
		1	6	12	48	72	144	288	360	720
			1	2	8	12	24	48	60	120
				1	4	6	12	24	30	60
					1	1½	3	6	7½	15
						1	2	4	5	10
							1	2	2½	5
								1	1¼	2½
									1	2

The keramion is equal to 35 French pints, or 8⅔ apothecaries gallons.

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* In the following tables much assistance has been derived from Mr Kelly's excellent work.

ANCIENT GREEK WEIGHTS.

Gold Talent.	*Attic Talent.*	*Attic Mina.*	*Gold Statera.*	*Didrachm.*	*Drachm.*	*Obolus.*	*Chalcoi.*
1 =	10 =	600 =	3000 =	30,000 =	60,000 =	360,000 =	2,160,000
	1 =	60 =	300 =	3000 =	6000 =	36,000 =	216,000
		1 =	5 =	50 =	100 =	600 =	3600
			1 =	10 =	20 =	120 =	720
				1 =	2 =	12 =	72
					1 =	6 =	36
						1 =	6

GREEK MEDICINAL WEIGHTS.

Mina.	*Littra.*	*Uncia.*	*Drachma.*	*Scrupulus.*	*Obolus.*	*Lupinus.*	*Siliqua.*	*Æreoli.*
1 =	1½ =	16 =	128 =	384 =	768 =	1152 =	2304 =	6144
	1 =	12 =	96 =	288 =	576 =	864 =	1728 =	4680
		1 =	8 =	24 =	48 =	72 =	144 =	384
			1 =	3 =	6 =	9 =	18 =	48
				1 =	2 =	3 =	6 =	16
					1 =	1½ =	3 =	8
						1 =	2 =	5⅓
							1 =	2⅔

There was also a smaller mina, containing 75 drachms. Authors differ as to the comparison between the ancient Greek and modern weights. The following numbers are troy grains:

	Attic Drachm.	*Attic Mina.*	*Smaller Mina.*	*Medicinal Mina.*
Arbuthnott,	54.6	54.64		6994
Christiani,	51.9	51.89	3892	
Paucton,	69.	69.00		

JEWISH WEIGHTS.

Shekels.	*Maneh.*	*Talent.*	*Troy Weight.*			
			lb.	*oz.*	*dwt.*	*gr.*
60 =	1					
300 =	50 =	1 =	113	10	1	10

EGYPTIAN WEIGHTS.

Drachm.	*Mina.*	*Talent.*	*Troy Weight.*		
			lb.	*oz.*	*dwt.*
100 =	1				
600 =	60 =	1 =	86	8	16

The mina was also divided into 16 ounces; and another pound, littra or ratel, was divided into 12; which may have been the origin of the two divisions of the European pound.

FORTUITOUS OR APPROXIMATIVE MEASUREMENT.

"There are many substances in daily use," says the editor of the last Parisian Pharmacopœia, "which we are accustomed to prescribe, not by weight, but by number, or by measures of various kinds, or by

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other means. But, in this way, their relative proportions to other substances is not known with sufficient accuracy, and there may be danger with medicines of considerable power and variable density, since often the same measure by no means corresponds with equal weights. We have therefore subjoined their true value, derived from experiments, so that their quantity may be easily and certainly compared with others of like nature."

"Liquids, which are prescribed by drops, especially if they be very volatile, as alcohol, ether, &c. were measured by the following contrivance, lest any error arise from their being easily dissipated. We filled with the liquid a phial having a narrow neck, and a flat lip (*ostiolus*) turned outwards. The weight of the phial and fluid together was then accurately ascertained, and, by inclining the phial, the liquor was allowed to drop slowly from the mouth, and the drops numbered; and, lastly, the phial, with the remaining liquor, was weighed. By dividing the loss of weight by the number of the drops, the weight of each drop was obtained. We have drawn up the following table in this way, in which is shewn the weight of twenty drops of each."

"But as the weight of the drops depends upon their size, it arises much less from the specific gravity of the liquid, than from the cohesion and viscidity of its particles."

Of the following liquids

Twenty drops weigh	*Fr. grains.*	*grammes.*
Æther sulphuricus, sp. gr. 0.715,	7	0.35
Æther sulph. alcoolisatus, or Liq. min. anod. H.	9	0.45
Alcool purissimus, sp. gr. 0.847,		
Alcoolatum melissæ compositum,		
Alcool potassa saturus,	10	0.50
Oleum animale Dipelii,		
Tinctura benzoini alcoolica,		
Tinctura castorei alcoolica,		
Oleum olivarum,	11	0.55
Oleum amygdalinum,		
Acidum aceticum densissimum, sp. gr. 1075,	12	0.60
Acidum aceticum commune, or Acetum stillat.	13	0.65
Oleum menthæ volatile,		
Oleum de petroleo volatile, or Naphtha,	14	0.70
Acidum sulphuricum alcoolisatum,		
Aquæ simplices stillatitiæ,		
Laudanum liquidum Sydenhami,	15	0.75
Oleum volatile de caryophyllis aromaticis,	16	0.80
Soda caustica liquida, sp. gr. 1321,	18	0.90
Aqua soluto magnesiæ sulphate satura,		
Laudanum of Abbé Rousseau,	22	1.10
Acidum hydrocyanicum, sp. gr. 900,	23	1.15
Acidum sulphuricum, sp. gr. 1847,	24	1.20
Gummi Arabicum aqua solutum ad $\frac{1}{8}$ totius,		
Syrupus de saccharo, sp. gr. 1321,	30	1.50

The practice of administering active fluids by drops has been long known to be inaccurate; but the extent of the evil was first ascertained by the accurate experiments of Mr Shuttleworth, surgeon, of Liverpool. Not only do the drops of different fluids from the same vessel, and of the same fluids from different vessels, differ much in size; but it appears that the drops of the same fluid differ, even to the extent of a third, from different parts of the lip of the same vessel. The custom of dropping active fluids should, therefore, be abolished entirely; and, as weighing is too troublesome and difficult for general use, we must have recourse to small measures accurately graduated, in the manner of Lane's *drop* measure, and the *grain* measure recommended by the Edinburgh college; but we must not be misled by their names; for they are measures of bulk, not of drops or of grains.

In the following table, the first column shews the weight, the second the number of drops, and the third the weight, of the extract, in a measured drachm of several active fluids, in circumstances as nearly similar as possible, as ascertained by Mr Shuttleworth; the last column shews the number of drops in a drachm of different fluids, according to Dr Niemann in the Pharmacopœia Batava:

	Grains.	*Drops.*	*Grains.*	*Drops.*
Distilled water,…………	60	60		60–80
Solution of arsenic,…….	60¾	60		
White wine,…………….	58¾	94		
Ipecacuanha wine,……..	59¾	84	2½	
Antimonial wine,………	59¾	84		
Rectified spirits of wine,.	51½	151½		
Proof spirit,…………….	54¼	140		
Laudanum,……………..	55½	134	2¾	90–110
Tincture of foxglove,…..	58	144		
Balsam of copaiva,……..				60–70
Spring water,……………				60–70
Diluted mineral acid,…..				60–80
Water of ammonia,…….				100–120
Spirit of sulphuric ether,				120–140
Tinctures,………………				140–180
Ether,…………………..				140–180

Larger quantities are measured by spoons, drinking glasses, and cups.

A tea-cup, commonly contains three or four ounces of an infusion, decoction, or mixture.

A wine-glass, about an ounce and a half.

A table-spoon, about half an ounce of watery fluids, and two or three drachms of alcoholic.

A tea-spoon, from half a scruple to a scruple of a light powder, such as magnesia, from half a drachm to two scruples of a heavier powder, as sulphur, and from one drachm to four scruples of a metallic oxide; from one scruple to half a drachm of alcoholic fluids; from half a drachm to two scruples of watery fluids; from two scruples to two drachms of tinctures and syrups, and from one to two drachms of electuaries. But all this is very uncertain.

The Paris Pharmacopœia makes the following estimations:—

		Grammes.
A wine glass contains more than 5 ounces	=	160
A table-spoon more than 5 drachms	=	20
A tea-spoon about $\frac{5}{4}$ of a drachm, or		5

Herbs and simples were estimated by the quantity that could be lifted or carried with convenience.

Manipulus, a handful which could be taken up in the hand, was generally reckoned equal to

Pugillus, a pinch, which could be lifted between the thumb and two first fingers.

Fasciculus, a bundle which could be carried under the arms.

The following table is from the Paris Pharmacopœia:

	Grammes.		*Oz.*	*Dr.*	*Scr.*	*Gr.*
Manipulus seminum hordei	101.40	or	3	2½	0	0
———————— lini...............	47.60		1½	0	0	0
——— farinæ de semine lini. ...	105.00		3	2	0	0
——— foliorum malvæ siccorum	43.90		1	3	0	0
———————— cichorei siccorum	30.60		1	0	0	0
——— florum tiliæ	40.10		1	2½	0	0
Pugillus florum anthemidis nobilis..	7.80		0	2	0	0
—————— arnicæ montanæ ...	6.20		0	1	2	0
—————— tussilaginis farfaræ..	6.20		0	1	2	0
—————— althææ officinalis ...	5.00		0	1	1	0
—————— malvæ................	3.20		0	0	0	60
——— seminum anethi feniculi.	7.00		0	1	0	60
———————— pimpinellæ anisi	4.40		0	1	½	0

Other weights noticed in the Paris Pharmacopœia:

A fresh egg of large size,—

	oz.	*dr.*	*gr.*		*gram.*	
The whole weighs	2	2	0	=	68	8
Without the shell	2	0	0	=	61	2
The white weighs	1	2	57	=	41	3
The yoke	0	5	15	=	19	9

Two ounces of almonds (without their shells,) contain 53 almonds in number.

	grains.		*gram.*	
Each weighs about	23	=	1	15
When stripped of their pellicle	20	=	1	

TABLES OF SPECIFIC GRAVITY.

Inflammables, &c.

Sulphur roll,	1.9907
——— native,	1.065 to 2.033
Phosphorus,	1.821 to 1.714
Diamond,	3.5212 to 3.658
Charcoal,	0.280 to 0.440
Iodine,	4.948
Pit coal,	1.232 to 1.420
Graphite,	1.000 to 1.245
Asphaltum,	1.450 to 2.060

Metals.

Platinum, hammered,	21.314	Brass,	8.006
Gold, hammered,	19.361	Zinc, hammered,	7.861
Quicksilver, frozen,	13.58	Steel,	7.833
——— distilled,	14.11	Tin, hammered,	7.799
Lead,	11.362	Soft iron,	7.788
Silver, hammered,	10.622	Antimony,	6.702
Bismuth,	9.832	Barium,	4.
Copper, hammered,	9.000	Potassium,	0.972
Cadmium,	8.694	Sodium,	0.865
Arsenic,	8.308		

Saline Solids.

	Newton	Muschenbroek.	Kirwan.	Hassenfratz.
Potassa,			4.6215	1.7085
——— carbonated,		2.749		2.0120
——— sulphated,		2.398	2.636	2.4073
——— nitrated,	1.900	1.901	1.933	1.9369
——— tartrated,				1.5567
——— supertartrate,		1.8745		1.9153
Soda,				1.336
—— carbonated,			1.421	1.3591
—— sulphated,				1.4457
—— muriated,	2.143	2.0835		2.2001
—— phosphated,				1.333
—— subborate,	1.714	1.7170		1.723
—— acetate,				2.109
—— tartrate				1.7437

		Newton.	Muschenbroek.	Kirwan.	Hassenfratz.
Ammonia carbonated,			1.5026	1.8245	0.9660
Salt of hartshorn,	1.496				
Sal ammoniac,	1.42 to 1.453				
Baryta,				4.000	2.3740
——— sulphated,	4.4 to 4.5				
——— muriated,					2.8257
Witherite, (carbonate),	4.3 to 4.338				
Strontia,					1.647
Strontianite,	3.6 to 3.9				
Lime,			2.3700	2.3908	1.5233
—— muriated,					1.7003
Chalk,	2.315 to 2.657				
Limestone,	2.6 to 2.7				
Marble,	2.515 to 2.857				
Spar,	2.693 to 2.718				
Gypsum, (sulphate),	2.274 to 2.322				
Anhydrite,	2.85 to 2.964				
Apatite (phosphate),	3.1				
Magnesia,				2.3298	0.3460
———— native,	2.13				
———— carbonated,					0.2940
———— sulphated,					1.6603
Alumina,				2.000	0.8200
—— sulphate,		1.714	1.726		1.7109
—— subsulphate, native,	1.669				
Alum,	1.714 to 1.85				
Zinc, sulphated,		1.912	1.900		1.9120
White vitriol,	1.912				
Iron, sulphated,			1.88		1.8399
—— acetated,					1.398
Dantzic copperas,	1.715				
English ditto,	1.839 to 1.880				
Copper, sulphated,				2.23	2.1943
Blue vitriol,	2.194 to 2.23				
Lead, acetated,	2.395 to 2.745		2.3953		2.3450
Mercury, muriate,					5.1398
———— submuriate,					7.1758
Tartar emetic,	2.246				

Vegetable Substances.

Gum Arabic,	1.4523
—— tragacanth,	1.3161
—— cherry,	1.4817
Asafœtida,	1.3275
Ammoniac, gum,	1.2071
Scammony, Smyrna,	1.2743
———— Aleppo,	1.2354

Galbanum,	1.2120
Sagapenum,	1.2008
Opoponax,	1.6226
Bdellium,	1.3717
Myrrh,	1.3600
Ivy gum,	1.2948
Gamboge,	1.2216
Euphorbium,	1.1244
Olibanum,	1.1732
Sarcocoll,	1.2654
Guaiac,	1.2289
Jalap resin,	1.2185
Benzoin,	1.0924
Sandarac,	1.0920
Common yellow or white rosin,	1.0727
Arcanson,	1.0857
Galipot,	1.0819
Baras,	1.0441
Frankincense,	1.173
Storax,	1.1098
Pitch,	1.15
Copal, opaque,	1.1398
——— transparent,	1.0452
——— Madagascar,	1.0600
——— Chinese,	1.0628
Elemi,	1.0182
Anime, oriental,	1.0284
——— occidental,	1.0426
Labdanum,	1.1862
Dragon's blood,	1.2045
Gum lac,	1.139
Tacamahac,	1.0463
Alouchi (Drymis Winteri),	1.0604
Caragna,	1.1244
Acajou gum,	1.4456
Bassora gum,	1.4346
Monbaris gum,	1.4206
Aloes, socotorine,	1.3795
—— hepatic,	1.3586
Extract of liquorice,	1.7228
——— acacia,	1.5153
——— areca,	1.4573
Catechu (mimosa),	1.3980
Extract of St John's wort,	1.5263
Mastiche,	1.0742
Caoutchouc,	0.9335
Camphor,	0.9887
Indigo,	0.7690
Arnotto,	0.5956

Amber,	1.078
Sugar, white,	1.616
Opium,	1.3366
Guaiac wood,	1.3330
Cork,	0.2400
Oak wood,	1.1700
Fir,	0.498 to 0.5500
Sanders wood, yellow,	0.809
———— red,	1.128
———— white,	1.041
Peruvian bark,	0.784
Sassafras wood,	0.482
Campeachy wood,	0.913
Brazil wood, red,	1.031
Lignum vitæ,	1.327
Barley,	1.279
Rye,	1.320
Wheat,	1.346
Acorn, dry,	0.755

Animal Substances.

Ambergris,	0.780 to 0.926
Wax, yellow,	0.965
—— white,	0.968
Ouarachi wax,	0.897
Spermaceti,	0.943
Beef fat,	0.9232
Veal fat,	9.9342
Mutton fat,	0.9235
Hog's fat,	0.9368
Pearl,	2.750
Coral,	2.690
Crab's eyes,	1.89
Ivory,	1.825 to 1.917
Human body,	1.111
Mutton suet,	0.9235
Butter,	0.9423
Tallow,	0.9419
Hog's lard,	0.9423 to 0.9568

Saline Fluids.

Sulphuric acid, purest of commerce, Dr Ure,	1.8452
———— concentrated, (1.930 Meissner),	1.342
———— real,	2.1250
Sulphurous acid, liquid, Bussy,	1.45
Nitrous acid, fuming, (1.03 Meissner),	1.625
Nitric acid, (1.43 Meissner),	1.5800

Muriatic acid, fuming,	1.205
Muriatic acid,	1.1940
Acetic acid, concentrated,	1.0626
Vinegar, white,	1.014
——— red,	1.025
——— distilled,	1.005
Carbonic acid, saturated solution,	1.0015
Ammonia, saturated solution,	0.8070
Hydrocyanic acid, (0.883 Meissner,)	0.7050

Solutions of Salts at 42° *Fahrenheit.* BISHOP WATSON.

	Saturated.	*In 12 waters.*
Lime,	1.001	
Arsenious acid,	1.005	
Borax,	1.010	
Oxalate of ammonia, (Thomson,)	1.0186	
Alum,	1.033	
Sulphate of soda,	1.052	1.029
Sulphate of potass,	1.054	
Muriate of ammonia,	1.072	1.026
Carbonate of ditto,	1.077	
Nitrate of potass,	1.095	1.050
Tartrate of potass and soda,	1.114	
Arseniate of potass,	1.184	
Muriate of soda,	1.198	1.059
Sulphate of copper,	1.150	1.052
——— iron,	1.157	1.043
——— magnesia,	1.218	
——— zinc,	1.386	1.045
Subcarbonate of potass,	1.534	

Fluids of various kinds.

Water, (Ice 0.930),	1.000
Sea water,	1.0263
Water from the Dead Sea,	1.2403
Alcohol, (Meissner 0.7930,)	0.8293
Brandy,	0.8371
Tokay wine,	1.054
Madeira wine,	1.0382
Champagne,	0.962
Moselle,	0.916
Sulphuric ether, (0.710 Meissner, 0.632 Lovitz,)	0.7396
Nitric ether,	0.9088
Muriatic ether, (Meissner,)	0.7296
Acetic ether, (.915 Meissner,)	0.8664
Mineral naphtha,	0.708
Turpentine, liquid,	0.991
Balsam of copaiva,	0.886

Oil of Amber,	0.886
—— Orange flowers,	0.880
—— Coriander,	0.865
—— Roman chamomile,	0.894
—— Balm,	0.881
—— Hyssop,	0.889 to 0.968
—— Sage,	0.901
—— Cummin,	0.905
—— Wormwood,	0.907
—— Dill seed,	0.913 to 0.994
—— Juniper berries,	0.858
—— Turpentine,	0.867 to 0.8697
—— Lavender,	0.8938
—— Mint,	0.898 to 0.975
—— Thyme,	0.902
—— Rosemary,	0.906
—— Peppermint,	0.920
—— Fennel leaves,	0.929
—— Tansy,	0.933
—— Scurvy grass,	0.943
—— Star anise,	0.982
—— Anise,	0.987
—— Cloves,	1.0363
—— Cinnamon,	1.0439
—— Fennel acid,	1.098
—— Sassafras,	1.078 to 1.094
Azeite de sassafras, native oil of laurel,	D. 0.871
Fluid camphor of Borneo,	D. 0.887
Linseed oil,	0.9403
Poppy oil,	0.9288
Almond oil, (fixed,)	0.9170
Olive oil,	0.9153
Walnut oil,	0.923
Hazle nut oil,	0.916
Hemp seed,	0.926
Cows butter,	0.8916
Poppy seed,	0.9288
Beech mast,	0.9176
Train oil,	0.9235
Cows milk,	1.0324
Asses milk,	1.0355
Human milk,	1.0203
Mares milk,	1.0346
Goats milk,	1.0341
Ewe milk,	1.0409
Cows whey,	1.0193
Blood (human),	1.045
Crassamentum,	1.126
Human urine,	1.0106
Honey,	1.450

Gases and Vapours chiefly according to Dr Thomson.

	Air = 1.000.	Water at 30°=1.000.	100 cubic inches weigh in grains
Hydrogen gas,	0.0694		2.118
Carbon vapour,	0.4166		
Carburetted hydrogen,	0.5555		
Ammonia,	0.5903		18.0035
Steam,	0.6250		19.0620
Subphosphuretted hydrogen,	0.6944		
Phosphorous vapour,	0.8333		
Phosphuretted hydrogen,	0.9027		
Hydrocyanic acid,	0.9375		
Bihydroguret of phosphorus,	0.9722		
Azotic gas,	0.9722		29.6527
Carbonic oxide,	0.9722		
Olefiant gas, (Henry,)	0.9760		
Atmospheric air,	1.0000	0.00130	30.500
Nitric oxide,	1.0417		
Oxygen,	1.1111		33.915
Sulphur vapour,	1.1111		
Sulphuretted hydrogen,	1.1805		
Muriatic acid,	1.2847		
Carbonic acid,	1.5277		46.5972
Nitrous gas,	1.5277		
Alcohol vapour, (Gay Lussac,)	1.6133		
Cyanogen,	1.8055		
Muriatic ether vapour, (Thenard,)	2.2190		
Tellurium vapour,	2.2222		
Sulphurous acid,	2.2222		
Telluretted hydrogen,	2.2916		
Fluoboric acid,	2.3611		
Protoxide of chlorine,	2.4444		
Chlorine,	2.5000		76.25
Sulphuric ether vapour, (Gay Lussac,)	2.5860		
Arsenic vapour,	2.6388		
Bisulphuret of carbon,	2.6388		
Arseniated hydrogen,	2.7083		
Sulphuric acid vapour,	2.7777		
Selenium vapour,	2.7777		
Selenietted hydrogen,	2.8522		
Naphtha vapour,	2.9166		
Nitrous acid,	3.1812		
Chloric ether vapour, (Gay Lussac,)	3.4434		
Chlorocarbonic acid,	3.4722		
Fluosilicic acid vapour,	3.6111		
Nitric acid vapour,	3.7500		
Hydriodic acid,	4.4340		
Oil of turpentine vapour, (Robiquet,)	5.0150		
Hydriodic ether vapour, (Gay Lussac,)	5.4749		

Table of Specific Gravities indicated in the different British Pharmacopœias.

	Dublin.	*London.*	*Edinburgh.*
Sulphuric ether,	765		
Alcohol,	815		
Rectified Spirit *(alcohol fortius,)*	840	835	835
Spirit of nitrous ether,	850		
Nitrous ether,	900		
Proof spirit *(alcohol dilutius,)*	930	930	935
Solution of ammonia,	936	960	
Oxymuriatic acid,	1003		
Distilled vinegar,	1006		
Tincture of muriate of iron (red,)	1050		
Acetic acid,	1070		
Solution of oxymuriate of potass,	1087		
——— carbonate of ammonia,	1095		
——— potass,	1100	1050	
——— sulphuret of potass,	1120		
——— carbonate of soda saturated,	1220		
Muriatic acid	1170	1160	1170
——— diluted,	1080		
Nitrous acid,	1500	1500	1520
——— diluted,	1280		
Sulphuric acid,	1845	1850	1845
——— diluted,	1090		

Percentage Hydrometers.

Many attempts have been made to divide the scales of hydrometers so as to indicate the *percentage* of the more active or valuable substance in its various states of dilution with water; such as of absolute alcohol, ether, acid, alkali or salt. It is obvious that each substance will require a differently graduated hydrometer, according to the peculiarities of the substance mixed with the water; and we must have one hydrometer for alcohol and another for ether, one for sulphuric and another for nitric acid. Besides, there are many other difficulties which attend attempts of this kind, of which a stronger proof cannot be given than the following comparisons from Meissner's profound treatise on the subject of Areometry.

The specific gravity of 0.920 corresponds with

$13\frac{5}{7}$ degree of Baumé's Areometer, according to Gerstner's computation.
$21\frac{2}{7}$ ——————— according to Gilpin's computation.
$14\frac{4}{5}$ ——— of Bentley's Areometer.
$12\frac{1}{2}$ ——— of the Dutch Areometer of 1805.
$13\frac{3}{5}$ ——— of the Dutch Areometer of 1792.
48 ——— of Lowitz's Alcoholmeter.
48 ——— of Richter's Alcoholmeter.
$48\frac{1}{2}$ ——— of scale A of Meissner's Alcoholmeter.
$54\frac{6}{10}$ ——— of scale B of the same.

$48\frac{5}{6}$ degree of scale A of Meissner's most improved Alcoholmeter of 1815.
$54\frac{7}{10}$ —— of scale B of the same.
56 —— of Trales's Alcoholmeter.
$57\frac{1}{2}$ —— of the Alcoholmeter for the Austrian Pharmacopœia 1812.
$62\frac{1}{4}$ —— of the Œconomical Alcoholmeter of 1812.

Also supposing that we are told that a fluid corresponds with the 65 of the areometer, we find that this corresponds with different sp. gr. according to different observers. It is reckoned by

Gerstner,	1.698
Gilpin,	1.8245
Bentley,	1.819
Dutch Areom.	1.823

In such discrepancy, it becomes necessary to ascertain the place of residence of the author, and the kind of areometer he has used.

In the chemical works in the neighbourhood of Glasgow and Paisley, an Areometer, a percentage hydrometer, called Twaddel's Hydrometer, is used, which is very convenient on account of the facility with which the sp. gr. of the liquid tried by it is ascertained. As the scale requires to be extensive, in order to be adapted for general use, several instruments bearing different parts of the scale are sold together, accompanied by the following instructions:

"In Twaddel's Hydrometer every degree rises .005 decimal parts of a thousand, No. 0. in hydrometer No. 1. being unity, to which point the instrument will sink in distilled water at 56° of Fahrenheit's thermometer.

"To find the sp. gr. of any fluid, multiply the point it stands at by 5; if it be immersed in a fluid in which it stands 170° in hydrometer No. 6, then multiply by 5.

$$\begin{array}{r} 170 \\ 5 \\ \hline 1.850 \end{array}$$

"The integer 1. being added as above, shews the real sp. gr. compared to water, it being 1000, the fluid which points to 170 is as 1850 to 1000, and so on."

Table shewing the Weight in Grains of various Measures of Fluids of different Specific Gravities.

	Sp. Gr.	*O ct.*	*Floz.*	*Fldr.*	♏
Distilled water,	1000	7305	456.5	57	0.9
Sulphuric ether,	765	5575	333	41.5	0.65
Alcohol,	815	5950	372.5	45.5	0.73
Rectified spirit,	835	6100	380	47.5	0.75
Oil of Turpentine,	868	6340	396	49.5	0.78
Proof spirit,	935	6825	425	53.2	0.84
Solution of ammonia,	936				
Solution of ammonia,	960	7000	535	63.2	0.86
Muriatic acid,	1170	8600	535	63.2	1.05
Syrup,	1321	9643	603		
Nitrous acid,	1500	10957	654	85.5	1.35
Sulphuric acid,	1845	13477	840	10.5	1.65

Table of the Specific Gravities indicated in the French Pharmacopœia, also according to the Batavian and Baumé's Areometrical Scales.

The French generally express the specific gravities of bodies according to the scale of Baumé, which had the singular inconvenience of assuming distilled water as the *zero* of the descending scale, in relation to all fluids heavier than itself, and of assuming it as 10 in the ascending scale, in relation to all fluids lighter than itself. But the Batavian, and afterwards the French College consider it as an improvement to assume distilled water as the zero both of the ascending and descending series of numbers. The specific gravities indicated in the French Pharmacopœia are adapted to the height of mercury in the barometer, being a centimeter, and the temperature in general of 14° Cent. or 19.5° of Reaumur, except in regard to the very volatile fluids, when it is estimated at 0°.

Baumé.	Batavian	Sp. Gr.	*Fluids lighter than water.*
		700	Acidum hydrocyanicum purum, *(violent poison,) Gay-Lussac.*
66	56	715	Ether sulphuricus purissimus.
60	50	742	Idem bonæ notæ.
50	40	782	
48	38	792	Æther sulphuricus alcoholisatus, consisting of equal parts of alcohol and æther.
42	32	819	Alcohol purissimus, for pharmaceutical purposes.
40	30	827	
36	26	847	Alcohol purus, naphtha.
33	23	863	Alcohol venalis, ($\frac{3}{6}$.)
32	22	868	Oleum terebinthinæ volatile.
30	20	878	
26	16	900	Acidum hydrocyanicum of Scheele; also the acidum hydrocyanicum purum of Robiquet, mixed with an equal quantity of water.
25	15	906	Æther aceticus.
23	13	915	
23	13	915	Æther nitricus. —— muriaticus. Ammonia liquida. Oleum olivarum.
22	12	923	
22	12	923	Alcoholes aquosi, commonly called aqua vitæ.
20	10	935	
18	8	948	
13	3	980	Vina { Burgundum. Burdigalense.
12	2	986	
11	1	993	
10	0	1000	Aqua stillata vulgaris.

Areom.	Sp. Gr.	*Fluids heavier than water.*
0	1000	Aqua stillata vulgaris.
1	1007	Acetum stillatitium.
	1009	
2	1014	Acetum vulgare.
4 5	1032	Lac vaccinum.
5	1036	Acetas ammoniæ.
10	1075	Acidum aceticum densius.
12	1091	
20	1161	
21	1180	Acidum hydrocloricum liquidum.
35	1210	
30	1261	Syrupus bulliens.
35	1321	Syrupus refrigeratus. Acidum nitricum vulgare.
40	1384	Acidum nitricum densius.
41	1398	
45	1454	
45	1454	Acidum phosphoricum, for medical use.
50	1532	
60	1714	
66	1847	Acidum sulphuricum densissimum.
70	1946	Acidum phosphoricum densissimum.

Comparison of the Degrees of Baumé's and Beck's Hydrometer *,

For Fluids lighter than Water.

Degree of Areometer.	Specific Gravity of Baumé.	Specific Gravity of Beck.	Degree of Areometer.	Specific Gravity of Baumé.	Specific Gravity of Beck.
0		1.0000	32	0.8638	0.8415
1		0.9941	33	0.8584	0.8374
2		0.9883	34	0.8531	0.8333
3		0.9826	35	0.8479	8.8292
4		0.9770	36	0.8428	0.8252
5		0.9714	37	0.8378	0.8212
6		0.9659	38	0.8329	0.8173
7		0.9604	39	0.8281	0.8133
8		0.9550	40	0.8233	0.8095
9		0.9497	41	0.8186	0.8056
10	1.0000	0.9444	42	0.8139	0.8018
11	0.9930	0.9392	43	0.8093	0.7981
12	0.9861	0.9340	44	0.8047	0.7943
13	0.9792	0.9289	45	0.8001	0.7906
14	0.9724	0.9239	46	0.7956	
15	0.9657	0.9189	47	0.7911	
16	0.9591	0.9139	48	0.7866	
17	0.9526	0.9090	49	0.7821	
18	0.9462	0.9042	50	0.7777	
19	0.9399	0.8994	51	0.7733	
20	0.9336	0.8947	52	0.7689	
21	0.9274	0.8900	53	0.7646	
22	0.9212	0.8854	54	0.7603	
23	0.9151	0.8808	55	0.7560	
24	0.9091	0.8762	56	0.7518	
25	0.9032	0.8717	57	0.7476	
26	0.8974	0.8673	58	0.7435	
27	0.8917	0.8629	59	0.7394	
28	0.8860	0.8585	60	0.7354	
29	0.8804	0.8542	61	0.7314	
30	0.8748	0.8500	62	0.7251	
31	0.8693	0.8457			

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* Baumé's hydrometer is used commonly in France, Beck's in Germany; the calculations in reference to the former are made by Huss, and in regard to the latter by Engelmann. The Table is copied from Buchner's Pharmacy, vol. ii.

with the Specific Gravity.

For Fluids heavier than Water.					
Degree of Areometer.	Specific Gravity of Baumé.	Specific Gravity of Beck.	Degree of Areometer.	Specific Gravity of Baumé.	Specific Gravity of Beck.
0	1.0000	1.0000	41	1.3947	1.3178
1	1.0070	1.0059	42	1.4082	1.3281
2	1.1041	1.0119	43	1.4219	1.3386
3	1.0213	1.0180	44	1.4359	1.3492
4	1.0286	1.0241	45	1.4501	1.3600
5	1.0360	1.0303	46	1.4645	1.3710
6	1.0435	1.0366	47	1.4792	1.3821
7	1.0511	1.0429	48	1.4942	1.3934
8	1.0588	1.0494	49	1.5096	1.4050
9	1.0666	1.0559	50	1.5253	1.4167
10	1.0745	1.0625	51	1.5413	1.4286
11	1.0825	1.0692	52	1.5576	1.4407
12	1.0906	1.0759	53	1.5742	1.4530
13	1.0988	1.0828	54	1.5912	1.4655
14	1.1071	1.0897	55	1.6086	1.4783
15	1.1155	1.0968	56	1.6264	1.4912
16	1.1240	1.1039	57	1.6446	1.5044
17	1.1326	1.1111	58	1.6632	1.5179
18	1.1414	1.1184	59	1.6823	1.5315
19	1.1504	1.1258	60	1.7019	1.5454
20	1.1596	1.1333	61	1.7220	1.5596
21	1.1690	1.1409	62	1.7427	1.5741
22	1.1785	1.1486	63	1.7640	1.5888
23	1.1882	1.1565	64	1.7858	1.6038
24	1.1981	1.1644	65	1.8082	1.6190
25	1.2082	1.1724	66	1.8312	1.6346
26	1.2184	1.1806	67	1.8548	1.6505
27	1.2288	1.1888	68	1.8790	1.6667
28	1.2394	1.1972	69	1.9038	1.6832
29	1.2502	1.2057	70	1.9291	1.7000
30	1.2612	1.2143	71	1.9548	1.7172
31	1.2724	1.2230	72	1.9809	1.7347
32	1.2838	1.2319	73	2.0073	1.7526
33	1.2954	1.2409	74	2.0340	1.7708
34	1.3072	1.2500	75	2.0610	1.7895
35	1.3190	1.2593	76		1.8085
36	1.3311	1.2687	77		1.8280
37	1.3434	1.2782	78		1.8478
38	1.3559	1.2879	79		1.8681
39	1.3686	1.2977	80		1.8889
40	1.3815	1.3077			

Comparative Scale of Thermometers,

Fahr.	*Centigr.*	*Reaumur.*	*Fahr.*	*Centigr.*	*Reaumur.*	*Fahr.*	*Centigr.*	*Reaumur.*
−40°	−40°	−32°	+ 2	−16.67	−13.33	44	+ 6.67	5.33
39	39.44	31.56	3	16.11	12.89	45	7.22	5.78
38	38.89	31.11	4	15.56	12.44	46	7.78	6.22
37	38.33	30.67	5	15	12	47	8.33	6.67
36	37.78	30.22	6	14.44	11.56	48	8.89	7.11
35	37.22	29.78	7	13.89	11.11	49	9.44	7.56
34	36.67	29.33	8	13.33	10.67	50	10	8
33	36.11	28.89	9	12.78	10.22	51	10.56	8.44
32	35.56	28.44	10	12.22	9.78	52	11.11	8.89
31	35	28	11	11.67	9.33	53	11.67	9.33
30	34.44	27.56	12	11.11	8.89	54	12.22	9.78
29	33.89	27.11	13	10.56	8.44	55	12.78	10.22
28	33.33	26.67	14	10	8	56	13.33	10.67
27	32.78	26.22	15	9.44	7.56	57	13.89	11.11
26	32.22	25.78	16	8.89	7.11	58	14.44	11.56
25	31.67	25.33	17	8.33	6.67	59	15	12
24	31.11	24.89	18	7.78	6.22	60	15.56	12.44
23	30.56	24.44	19	7.22	5.78	61	16.11	12.89
22	30	24	20	6.67	5.33	62	16.67	13.33
21	29.44	23.56	21	6.11	4.89	63	17.22	13.78
20	28.89	23.11	22	5.56	4.44	64	17.78	14.22
19	28.33	22.67	23	5	4	65	18.33	14.67
18	27.78	22.22	24	4.44	3.56	66	18.89	15.11
17	27.22	21.78	25	3.89	3.11	67	19.44	15.56
16	26.67	21.33	26	3.33	2.67	68	20	16
15	26.11	20.89	27	2.78	2.22	69	20.56	16.44
14	25.56	20.44	28	2.22	1.78	70	21.11	16.89
13	25	20	29	1.67	1.33	71	21.67	17.33
12	24.44	19.56	30	1.11	0.89	72	22.22	17.78
11	23.89	19.11	31	0.56	0.44	73	22.78	18.22
10	23.33	18.67	32	0	0	74	23.33	18.67
9	22.78	18.22	33	+ 0.56	+0.44	75	23.89	19.11
8	22.22	17.78	34	1.11	0.89	76	24.44	19.56
7	21.67	17.33	35	1.67	1.33	77	25	20
6	21.11	16.89	36	2.22	1.78	78	25.56	20.44
5	20.56	16.44	37	2.78	2.22	79	26.11	20.89
4	20	16	38	3.33	2.67	80	26.67	21.33
3	19.44	15.56	39	3.89	3.11	81	27.22	21.78
2	18.89	15.11	40	4.44	3.56	82	27.78	22.22
1	18.33	14.67	41	5	4	83	28.33	22.67
0	17.78	14.22	42	5.56	4.44	84	28.89	23.11
+ 1	17.22	13.78	43	6.11	4.89	85	29.44	23.56

Fahrenheit, Centigrad, and Reaumur.

Fahr.	*Centigr.*	*Reaumur.*	*Fahr.*	*Centigr.*	*Reaumur.*	*Fahr.*	*Centigr.*	*Reaumur.*
86	+30	+24	+129	+53.89	+43.11	+171	+77.22	+61.78
87	30.56	24.44	130	54.44	43.56	172	77.78	62.22
88	31.11	24.89	131	55	44	173	78.33	62.67
89	31.67	25.33	132	55.56	44.44	174	78.89	63.11
90	32.22	25.78	133	56.11	44.89	175	79.44	63.56
91	32.78	26.22	134	56.67	45.33	176	80	64
92	33.33	26.67	135	57.22	45.78	177	80.56	64.44
93	33.89	27.11	136	57.78	46.22	178	81.11	64.89
94	34.44	27.56	137	58.33	46.67	179	81.67	65.33
95	35	28	138	58.89	47.11	180	82.22	65.78
96	35.56	28.44	139	59.44	47.56	181	82.78	66.22
97	36.11	28.89	140	60	48	182	83.33	66.67
98	36.67	29.33	141	60.56	48.44	183	83.89	67.11
99	37.22	29.78	142	61.11	48.89	184	84.44	67.56
100	37.78	30.22	143	61.67	49.33	185	85	68
101	38.33	30.67	144	62.22	49.78	186	85.56	68.44
102	38.89	31.11	145	62.78	50.22	187	86.11	68.89
103	39.44	31.56	146	63.33	50.67	188	86.67	69.33
104	40	32	147	63.89	51.11	189	87.22	69.78
105	40.56	32.44	148	64.44	51.56	190	87.78	70.22
106	41.11	32.89	149	65	52	191	88.33	70.67
107	41.67	33.33	150	65.56	52.44	192	88.89	71.11
108	42.22	33.78	151	66.11	52.89	193	89.44	71.56
109	42.78	34.22	152	66.67	53.33	194	90	72
110	43.33	34.67	153	67.22	53.78	195	90.56	72.44
111	43.89	35.11	154	67.78	54.22	196	91.11	72.89
112	44.44	35.56	155	68.33	54.67	197	91.67	73.33
113	45	36	156	68.89	55.11	198	92.22	73.78
114	45.56	36.44	157	69.44	55.56	199	92.78	74.22
115	46.11	36.89	158	70	56	200	93.33	74.67
116	46.67	37.33	159	70.56	56.44	201	93.89	75.11
117	47.22	37.78	160	71.11	56.89	202	94.44	75.56
118	47.78	38.22	161	71.67	57.33	203	95	76
119	48.33	38.67	162	72.22	57.78	204	95.56	76.44
120	48.89	39.11	163	72.78	58.22	205	96.11	76.89
121	49.44	39.56	164	73.33	58.67	206	96.67	77.33
122	50	40	165	73.89	59.11	207	97.22	77.78
123	50.56	40.44	166	74.44	59.56	208	97.78	78.22
124	51.11	40.89	167	75	60	209	98.33	78.67
125	51.67	41.33	168	75.56	60.44	210	98.89	79.11
126	52.22	41.78	169	76.11	60.89	211	99.44	79.56
127	52.78	42.22	170	76.67	61.33	212	100	80
128	53.33	42.67						

CORRESPONDENCE BETWEEN DIFFERENT THERMOMETERS.

Fahrenheit's thermometer is universally used in this kingdom. In it the range between the freezing and boiling points of water is divided into 180 degrees; and as the greatest possible degree of cold was supposed to be that produced by mixing snow and muriate of soda, it was made the zero; hence the freezing point became 32°, and the boiling point 212°.

The Centigrade thermometer places the zero at the freezing point, and divides the range between it and the boiling point into 100°. This has long been used in Sweden, under the title of Celsius's thermometer.

Reaumur's thermometer, which was formerly used in France, divides the space between the freezing and boiling of water into 80°, and places the zero at the freezing point.

Wedgwood's pyrometer is only intended to measure very high temperatures. According to its author, its zero corresponds with 1077 of Fahrenheit's, and each degree of Wedgwood is equal to 130 of Fahrenheit. Guyton Morveau has, however, given good reason for believing that the zero is placed too high, and that the measure of the degree of this scale has been much overrated; and he accordingly fixes the zero of Wedgwood at 517.579 Fahrenheit, and reduces the measure of the degree of Wedgwood to 62.5 of Fahrenheit.

De Lisle's thermometer is used in Russia. The graduation begins at the boiling point, and increases towards the freezing point. The boiling point is marked 0, and the freezing point 150.

Therefore $180^\circ \text{ F.} = 100^\circ \text{ C.} = 80 \text{ R.} = \frac{18}{13} \text{ W}$, or $= \frac{180}{62.5} \text{ W}$.

Formulæ.

1. To reduce centigrade degrees to those of Fahrenheit, multiply by 9, and divide by 5, and to the quotient add 32, that is, $\frac{\text{C.} \times 9}{5} + 32 = \text{F.}$

2. To reduce Fahrenheit's degrees to centigrade, $\frac{\text{F.} - 32 \times 5}{9} = \text{C.}$

3. To reduce Reaumur's to Fahrenheit's, $\frac{\text{R.} \times 9}{4} + 32 = \text{F.}$

4. To convert Fahrenheit to Reaumur, $\frac{\text{F.} - 32 \times 4}{9} = \text{R.}$

5. To reduce Wedgwood's degrees to those of Fahrenheit, $\text{W.} \times 130 + 1077 = \text{F.}$; or, according to Guyton Morveau's estimate, $\text{W.} \times 62.5 + 517.579 = \text{F.}$

6. Inversely, to reduce Fahrenheit to Wedgwood, $\frac{\text{F.} - 1077}{130} = \text{W.}$;

or according to Guyton Morveau, $\frac{\text{F.} - 517.579}{62.5} = \text{W.}$

Table of the Effects of Heat.

1. FREEZING POINTS OF LIQUIDS, AND MELTING POINT OF SOLIDS.

Fahren.	
—90	Greatest artificial cold observed.
—55	Strongest nitric acid freezes (Cavendish.)
—46	Ether and liquid ammonia freeze.
—39	Mercury freezes.
—36	Sulphuric acid freezes, (Thomson.)
—22	Acetous acid freezes.
—11	2 Alcohol, one water freeze.
—7	Brandy freezes.
+1	Strongest sulphuric acid freezes, (Cavendish.)
4	Solution freezes of 1 salt in water, 3.
7	——————— 1 salt in water, 4.
8	——————— 1 sal ammoniac in water, 4.
16	Oil of turpentine freezes, (Margueron.)
20	Strong wines freeze.
23	Fluoric acid freezes.
	Oils of bergamot and cinnamon freeze.
25	Human blood freezes.
28	Vinegar freezes.
30	Milk freezes.
32	Water freezes.
36	Olive oil freezes.
40	Equal parts sulphur and phosphorus melt.
42	Sulphuric acid, specific gravity, 1.741 freezes.
45	——————————— 1.78 freezes, (Keir.)
50	Strong acetic acid.
64	Oil of aniseeds freezes.
82	Adipocire of muscle melts.
97	Lard melts, (Nicholson.)
99	Phosphorus melts, (Pelletier.)
104	Resin of bile melts.
109	Myrtle wax melts, (Cadet.)
112	Stearin from hogs lard.
112	Spermaceti melts, (Bostock.)
127	Tallow (Nicholson) 92 (Thomson.)
142	Bees wax.
145	Ambergris, (La Grange.)
150	Potassium.
155	Bleached wax, (Nicholson.)
200	Sodium perfectly fluid.
210	Bismuth, 5 parts, tin 3, lead 2, (Dalton.)
	Iodine, (Gay Lussac.)
234	Sulphur (Hope,) 218 (Thomson,) 185 (Kirwan.)
235	Adipocire of biliary calculi (Fourcroy.)
283	Tin and bismuth, equal parts.
303	Camphor (175 Cent. 348 F.)

Fahren.		*Wedg.*
334	Tin 3, lead 2; or tin 2, bismuth 1.	
442	Tin (Crichton,) (413 Irvine.)	
460	Tin 1, lead 4.	
476	Bismuth, (Irvine.)	
612	Lead (Crichton,) (594 Irvine,) (540 Newton.)	
700	Zinc.	
809	Antimony.	
3807	Brass,	21
4587	Copper,	27
4717	Silver,	28
5237	Gold,	32
17977	Cobalt, cast-iron,	130
20577	Nickel,	150
21097	Soft nails,	154
21637	Iron,	158
21877	Manganese,	160
23177	Platinum, Tungsten, Molybdenum, Uranium, Titanium, &c.	170+

2. SOLIDS AND LIQUIDS VOLATILIZED.

14	Liquid sulphurous acid boils, (Bussy.)
98	Ether boils.
113	Fuming sulphurous acid boils, (Bussy.)
126	Bisulphuret of carbon boils.
140	Liquid ammonia boils.
145	Camphor sublimes, (Venturi,) (400 Fahr.)
170	Sulphur evaporates, (Kirwan.)
176	Alcohol (174 Black,) (173 sp. gr. 0.800 Henry.)
212	Water boils.
219	Phosphorus distils, (Pelletier.)
225	Water saturated with sea salt boils.
230	Muriate of lime boils, (Dalton.)
242	Nitrous acid boils.
248	Nitric acid boils.
283	White oxide of arsenic sublimes.
304	Oil of turpentine boils, (Dr Ure.)
316	Petroleum boils, (Dr Ure.)
540	Metallic arsenic sublimes.
554	Phosphorus boils in close vessels.
570	Sulphur boils, (600 Davy.)
590	Sulphuric acid boils, (Dalton,) (546 Black.)
600	Linseed oil boils.
660	Mercury, (Dalton,) (644 Secondat,) (600 Black,) 672 Irvine,) (656 Petit and Dulong.)

3. MISCELLANEOUS EFFECTS OF HEAT.

—90	Greatest cold produced by Mr Walker.
—50	Natural cold observed at Hudson's Bay.
—23	Observed on the surface of the snow at Glasgow, 1780.

Fahren.		*Wedg.*
0	Equal parts, snow and salt.	
+43	Phosphorus burns slowly.	
59	Vinous fermentation begins.	
66	to 135, Animal putrefaction.	
75	to 80, Summer heat in Britain.	
77	Vinous fermentation rapid ; acetous begins.	
80	Phosphorus burns in oxygen, (104 Gottling.)	
88	Acetification ceases, phosphorus ductile.	
96	to 100, Animal temperature.	
107	Feverish heat.	
122	Phosphorus burns vividly (Fourcroy) (148 Thomson.)	
130	Ammonia disengaged from water.	
165	Albumen coagulates (156 Black.)	
303	Sulphur burns slowly.	
600	Boracium burns.	
635	Lowest ignition of iron in the dark.	
750	Iron bright in the dark.	
800	Hydrogen burns, (1000 Thomson.)	
802	Charcoal burns, (Thomson.)	
884	Iron red in twilight.	
1050	Iron red hot in a common fire.	
1077	Iron red in day light,	1
1300	Azotic gas burns,	2
1807	Enamel colours burned,	6
2897	Diamond burns, (Mackenzie) (5000 Morveau,)	14
5237	Settling heat of plate glass,	29
6507	Delft ware fired,	40
8480	Working heat of plate glass,	57
10177	Flint glass furnace,	70
12257	Cream-coloured ware fired,	86
13297	Worcester china vitrified,	94
14337	Stone ware fired,	102
14727	Chelsea china fired,	105
15637	Derby china fired,	112
15897	Flint glass furnace, greatest heat,	114
16007	Bow china vitrified,	121
16807	Plate glass, greatest heat,	124
17327	Smith's forge,	125
20577	Hessian crucible fused,	150
25127	Greatest heat observed,	185
	Extremity of Wedgwood's scale,	240

Table of High Degrees of Heat, according to the correction of Wedgwood's scale by Guyton Morveau.

Reaum.	*Cent.*	*Fahr.*	*Wedg.*	
215.9	269.9	517.76	0	Red heat in day light.
252.4	315.6	599.6		Linseed oil boils.
257.8	322.2	612.		Lead melts.
271.4	339.3	642.75	2	Mercury boils.
299.2	374.	705.25	3	Zinc melts.
382.6	478.2	892.74	6	Enamels melt.
410.2	512.9	955.23	7	Antimony melts.
438.1	547.6	1017.73	8	Copper 1 and tin 3 melt.
465.8	582.3	1080.23	9	Silver 1 and tin 1 melt.
521.8	651.8	1205.22	11	Copper and tin, equal parts, melt.
632.6	790.7	1455.21	15	Copper 3 and tin 1 melt.
799.2	998.9	1836.17	21	Brass melts.
827.	1033.7	1892.67	22	Silver melts.
965.9	1207.3	2205.15	27	Copper melts.
1104.8	1380.9	2517.63	32	Gold melts.
2715.8	3394.7	6196.40	90	Iron, sweating heat.
2854.7	3568.3	6508.88	95	Iron welding heat.
3549.1	4436.3	8071.28	120	Porcelain of china softens.
3688.	4609.9	8383.76	125	Smiths forge.
3826.9	4783.5	8696.24	130	Cast iron melts.
4243.6	5651.5	9633.68	155	Porcelain melts.
4382.4	5825.1	10517.12	160	Manganese melts.
4821.3	5998.7	10829.60	165	Heat of Macquer's furnace.
4938.0	6172.3	11142.08	170	Furnace with three blasts.
5076.9	6345.9	11454.56	175	Soft iron melts.
*	*	*	*	Nickel melts.
				Platinum melts.

Temperature at which various Pharmaceutical Phenomena take place, as indicated in the Centigrade, Reaumur, and Fahrenheit's scale, in the French Pharmacopœia.

Reaumur.	*Centigrad.*	*Fahrenheit.*	
84	105.	221	Syrup boils.
83	103.75	$218\frac{3}{4}$	Water in which there is dissolved $\frac{2}{10}$ of muriate of soda boils.
82	102.50	$216\frac{1}{2}$	Water with $\frac{4}{10}$ of muriate of lime boils.
80	100.00	212	Common water boils.
80	100.00	212	Heat of water placed in a boiling *balneum maris*, prepared with water containing $\frac{2}{10}$ of muriate of soda, or at $218\frac{3}{4}$ F.
78	97.5	207	Heat of water in a boiling water bath of pure water. Olive oil and Castor oil acquire the same temperature in the same bath.
65	81.25	$178\frac{1}{4}$	Alcohol, sp. gr. 923, boils in a water bath.
65	81.25	$178\frac{1}{4}$	The same degree of temperature is observed when water begins to simmer.
63	78.75	$173\frac{3}{4}$	Alcohol, sp. gr. 878, boils in a water bath.
$62\frac{1}{2}$	78.125	$172\frac{5}{8}$	Alcohol, sp. gr. 847, boils in a water bath.
62	77.50	$171\frac{1}{2}$	Alcohol, sp. gr. 827, boils in a water bath.
60	75.00	167	The heat of the water bath in which pure ether will distill.
35	43.75	$110\frac{3}{4}$	The heat at which tea and other warm drinks are taken.
			The feet are commonly immersed in water heated to $117\frac{1}{2}$ F., but not without pain; nor can they bear it unless they are not moved.
x	*x*	*x*	The heat of sand baths is so uncertain, as not to be capable of being ascertained or defined, unless by trying it during the operation.
40 20	50.00 25.00	122 77	Various degrees of heat exist within these limits, which is employed to dry fruits, herbs, flowers, and other medicines.
30 28	37.50 35.00	$99\frac{1}{2}$ 95	These degrees of heat are particularly suited to the digesting of tinctures.
20 15	25.00 18.75	77 $65\frac{3}{4}$	This degree of the scale constitutes the temperature of the air at which fermentation proceeds.
14	75.50	$63\frac{1}{2}$	This temperature of the air is used for examining the density of fluids by the hydrometer.
0	0.0	32	This is the temperature at which ice melts; it is also the temperature at which receivers are kept which are employed in various distillations; and also that at which the gravity of very volatile liquids is ascertained.

TABLES.

Frigorific Mixtures, selected from Mr Walker's Publication, 1808, *communicated by the Author.*

Frigorific Mixtures, *without Ice.*

Mixtures.		*Thermometer sinks.*	*Degree of cold produced.*
Muriate of ammonia Nitrate of potash Water	5 parts 5 16	From + 50° to + 10°	40
Sulphate of soda Diluted nitric acid	3 parts 2	From + 50 to — 3	53
Sulphate of soda Nitrate of ammonia Diluted nitric acid	6 parts 5 4	From + 50 to — 14	64
Phosphate of soda Nitrate of ammonia Diluted nitric acid	9 parts 6 4	From + 50 to — 21	71

N. B.—If the materials are mixed at a *warmer* temperature than that expressed in the table, the effect will be proportionally *greater ;* thus if the most powerful of these mixtures be made when the air is + 85°, it will sink the thermometer to + 2°.

Frigorific Mixtures, *with Ice.*

Mixtures.		*Thermometer sinks.*		*Degree of cold produced.*
Snow, or pounded ice, Muriate of soda,	2 parts 1	*From any temperature.*	to —5°	*
Snow, or pounded ice, Muriate of soda, Nitrate of ammonia,	12 parts 5 5		to —25	*
Snow, Diluted sulphuric acid,	3 parts 2	From + 32 to —23		55
Snow, Cryst. muriate of lime,	2 parts 3	From + 32 to —50		82

N. B.—The reason for the *omissions* in the last column of this table is, the thermometer sinking in these mixtures to the degree mentioned in the preceding column, *and never lower,* whatever may be the temperature of the materials at mixing.

Combinations of Frigorific Mixtures.

Mixtures.	*Thermometer sinks.*	*Degree of cold produced.*
Snow - - - 3 parts Diluted nitric acid 2	From 0 to —46	46
Snow - - 8 parts Diluted sulphuric acid 3 Diluted nitric acid 3	From —10 to —56	46
Snow - - 2 parts Muriate of lime - 3	From —15 to —68	53
Snow - - 8 parts Diluted sulphuric acid 10	From —68 to —91	23

N. B.—The materials in the first column are to be cooled, previously to mixing, to the temperature required, by mixtures taken from either of the preceding tables.

Electrical System of Bodies by Ritter.

NEGATIVE POLE.

INSULATORS.	CONDUCTORS.
Sulphur.	Water.
Sealing wax.	Oxide of manganese.
Black silk.	Metallic sulphurets.
White silk.	Charcoal.
Paper.	Silver.
Wool.	Copper.
Glass.	Iron.
Tourmalin.	Lead.
Diamond.	Zinc.

POSITIVE POLE.

Dr Henry has adopted the distribution of Elementary Bodies into Electro-negative and Electro-positive. To the former class belong

Oxygen.
Chlorine.
Iodine.
Fluorine.

To the latter all other bodies.

CONDUCTORS.

Perfect.	*Imperfect.*
Metals.	Water.
Plumbago.	Alcohol.
Charcoal.	Ether.
Mineral acids.	Sulphur.
Saline solutions.	Oils.
	Resins.
	Metallic oxides.
	Compounds of chlorine.

Table of some Galvanic Circles composed of two Perfect and one Imperfect Conductor.

Perfect.		*Imperfect.*
Zinc.	Any two of these solid conductors may be used, and each of them is the positive pole to all the metals below it in the list, and the negative to those above. This relation is reversed when the imperfect conductor is the solution of a hydrosulphuret.	Solutions of
Iron.		Nitric acid.
Tin.		Muriatic acid.
Lead.		Sulphuric acid.
Copper.		Sal ammoniac.
Silver.		Nitre.
Gold.		Other neutral salts.
Platinum.		
Charcoal.		

Table of Galvanic Circles composed of two Imperfect and one Perfect Conductor.

Imperfect.	*Perfect.*	*Imperfect.*
Solution of	Copper.	Nitric acid.
Alkaline sulphuret.	Silver.	Sulphuric acid.
Potash.	+ Lead.—	Muriatic acid.
Soda.	Tin.	Any dilute acid.
The alkaline solutions abstract electricity from the metal.	Zinc.	N. B. The acid solutions transmit electricity to the metal.
	Other metals.	
	Charcoal.	

MEDICAL DEPARTMENT,
YORKSHIRE COLLEGE,
VICTORIA UNIVERSITY

TABLES OF SIMPLE AFFINITY.

OXYGEN.

Carbon,
Manganese,
Zinc,
Iron,
Tin,
Antimony,
Hydrogen,
Phosphorus,
Sulphur,
Arsenic,
Nitrogen,
Nickel,
Cobalt,
Copper,
Bismuth,
Caloric ?
Mercury,
Silver,
Arsenious acid,
Nitric oxide,
Gold,
Platinum,
Carbonic oxide,
Muriatic acid,
Metallic bases of the earths and alkalies.

OXYGEN [*].

Titanium,
Manganese,
Zinc,
Iron,
Tin,
Uranium,
Molybdenum,
Tungsten,
Cobalt,
Antimony,
Nickel,
Arsenic,
Chromum,
Bismuth,
Lead,
Copper,
Tellurium,
Platinum,
Mercury,
Silver,
Gold,

CARBON.

Oxygen,
Iron,
Hydrogen.

NITROGEN.

Oxygen,
Sulphur ?
Phosphorus,
Hydrogen.

HYDROGEN.

Chlorine,
Oxygen,
Iodine,
Sulphur,
Carbon,
Phosphorus,
Nitrogen.

SULPHUR.
PHOSPHORUS ?

Potass,
Soda,
Iron,
Copper,
Tin,
Lead,
Silver,
Bismuth,
Antimony,
Mercury,
Arsenic,
Molybdenum.

POTASS, SODA, AND AMMONIA.

Acids. Sulphuric,
Nitric,
Muriatic,
Phosphoric,
Fluoric,
Oxalic,
Tartaric,
Arsenic,
Succinic,
Citric,
Lactic,
Benzoic,
Sulphurous,
Acetic,
Mucic,
Acids. Boracic,
Nitrous,
Carbonic,
Prussic,
Oil,
Water,
Sulphur.

BARYTA.

Acids. Sulphuric,
Oxalic,
Succinic,
Fluoric,
Phosphoric,
Mucic,
Nitric,
Muriatic,
Suberic,
Citric,
Tartaric,
Arsenic,
Lactic,
Benzoic
Acetic,
Boracic,
Sulphurous,
Nitrous,
Carbonic,
Prussic,
Sulphur,
Phosphorus,
Water,
Fixed oil.

STRONTIA.

Acids. Sulphuric,
Phosphoric,
Oxalic,
Tartaric,
Fluoric,
Nitric,
Muriatic,
Succinic,
Acetic,
Arsenic,
Boracic,
Carbonic,
Water.

LIME.

Acids. Oxalic,
Sulphuric.
Acids. Tartaric,
Succinic,
Phosphoric,
Mucic,
Nitric,
Muriatic,
Suberic,
Fluoric,
Arsenic,
Lactic,
Citric,
Malic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Nitrous,
Carbonic,
Prussic,
Sulphur,
Phosphorus,
Water,
Fixed oil.

MAGNESIA.

Acids. Oxalic,
Phosphoric,
Sulphuric,
Fluoric,
Arsenic,
Mucic,
Succinic,
Nitric,
Muriatic,
Tartaric,
Citric,
Malic ?
Lactic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Nitrous,
Carbonic,
Prussic,
Sulphur.

ALUMINA.

Acids. Sulphuric,
Nitric,
Muriatic,
Oxalic,

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[*] Vauquelin's table of the affinity of the metals for oxygen, according to the difficulty with which their oxides are decomposed by heat.

Tables of Simple Affinity,—continued.

Acids. Arsenic,
Fluoric,
Tartaric,
Succinic,
Mucic,
Citric,
Phosphoric,
Lactic,
Benzoic,
Acetic,
Boracic,
Sulphurous,
Nitrous,
Carbonic,
Prussic.

SILICA.

Acid. Fluoric,
Potass.

OXIDE OF PLATINUM.
OXIDE OF GOLD *.

Acids. Gallic,
Muriatic,
Nitric,
Sulphuric,
Arsenic,
Fluoric,
Tartaric,
Phosphoric,
Oxalic,
Citric,
Acetic,
Succinic,
Prussic,
Carbonic,
Ammonia.

OXIDE OF SILVER.

Acids. Gallic,
Muriatic,
Oxalic,
Sulphuric,
Mucic,
Phosphoric,
Sulphurous,
Nitric,
Arsenic,
Fluoric,
Tartaric,
Citric,
Lactic,
Succinic,
Acetic,
Prussic,
Carbonic,
Ammonia.

OXIDE OF MERCURY.

Acids. Gallic,
Muriatic,
Oxalic,
Succinic,
Arsenic,
Phosphoric,
Sulphuric,
Mucic,
Tartaric,
Citric,
Malic,
Sulphurous,
Nitric,
Fluoric,
Acetic,
Benzoic,
Boracic,
Prussic,
Carbonic.

OXIDE OF LEAD.

Acids. Gallic,
Sulphuric,
Mucic,
Oxalic,
Arsenic,
Tartaric,
Phosphoric,
Muriatic,
Sulphurous,
Suberic,
Nitric,
Fluoric,
Citric,
Malic,
Succinic,
Lactic,
Acetic,
Benzoic,
Boracic,
Prussic,
Carbonic,
Fixed oils,
Ammonia.

OXIDE OF COPPER.

Acids. Gallic,
Oxalic,
Tartaric,
Muriatic,
Sulphuric,
Acids. Mucic,
Nitric,
Arsenic,
Phosphoric,
Succinic,
Fluoric,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic,
Fixed alkalies,
Ammonia,
Fixed oils.

OXIDE OF ARSENIC.

Acids. Gallic,
Muriatic,
Oxalic,
Sulphuric,
Nitric,
Tartaric,
Phosphoric,
Fluoric,
Succinic,
Citric,
Acetic,
Prussic
Fixed alkalies,
Ammonia,
Fixed oils,
Water.

OXIDE OF IRON.

Acids. Gallic,
Oxalic,
Tartaric,
Camphoric,
Sulphuric,
Mucic,
Muriatic,
Nitric,
Phosphoric,
Arsenic,
Fluoric,
Succinic,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic.

OXIDE OF TIN †.

Acids. Gallic,
Muriatic,
Sulphuric,
Oxalic,
Tartaric,
Arsenic,
Phosphoric,
Nitric,
Succinic,
Fluoric,
Mucic,
Citric,
Lactic,
Acetic,
Boracic,
Prussic,
Ammonia.

OXIDE OF ZINC.

Acids. Gallic,
Oxalic,
Sulphuric,
Muriatic,
Mucic,
Nitric,
Tartaric,
Phosphoric,
Citric,
Succinic,
Fluoric,
Arsenic,
Lactic,
Acetic,
Boracic,
Prussic,
Carbonic,
Fixed alkalies,
Ammonia.

OXIDE OF ANTIMONY.

Acids. Gallic,
Muriatic,
Benzoic,
Oxalic,
Sulphuric,
Nitric,
Tartaric,
Mucic,
Phosphoric,
Citric,
Succinic,
Fluoric,
Arsenic,
Lactic,

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* Omitting the oxalic, citric, succinic, and carbonic, and adding sulphuretted hydrogen after ammonia.

† Bergman places the tartaric before the muriatic.

Tables of Simple Affinity,—continued.

Acids. Acetic,
Boracic,
Prussic,
Fixed alkalies,
Ammonia.

SULPHURIC ACID.
PRUSSIC [*].
Baryta,
Strontia,
Potass,
Soda,
Lime,
Magnesia,
Ammonia,
Glucina,
Gadolina,
Alumina,
Zirconia,
Metallic Oxides.

SULPHUROUS ACID.
SUCCINIC [†].
Baryta,
Lime,
Potass,
Soda,
Strontia,
Magnesia,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic Oxides.

PHOSPHORIC ACID.
CARBONIC [‡].
Baryta,
Strontia,
Lime,
Potass,
Soda,
Ammonia,
Magnesia,
Glucina,
Alumina,
Zirconia,
Metallic Oxides,
Silica.

PHOSPHOROUS ACID.
Lime,
Baryta.
Strontia,
Potass,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic Oxides.

NITRIC ACID.
MURIATIC [§].
Baryta,
Potass,
Soda,
Strontia,
Lime,
Magnesia,
Ammonia,
Glucina,
Alumina,
Zirconia,
Metallic Oxides.

FLUORIC ACID.
BORACIC [‖].
ARSENIC [¶].
TUNGSTIC.
Lime,
Baryta,
Strontia,
Magnesia,
Potass,
Soda,
Ammonia,
Glucina,
Alumina,
Zirconia,
Silica.

ACETIC ACID.
LACTIC. SUBERIC [**].
Baryta,
Potass,
Soda,
Strontia,
Lime,
Ammonia,
Magnesia,
Metallic Oxides,
Glucina,
Alumina,
Zirconia.

OXALIC ACID.
TARTARIC.
CITRIC [††].
Lime,
Baryta,
Strontia,
Magnesia,
Potass,
Soda,
Ammonia,
Alumina,
Metallic Oxides,
Water,
Alkohol.

BENZOIC ACID.
White Oxide of Arsenic,
Potass,
Soda,
Ammonia,
Baryta,
Lime,
Magnesia,
Alumina,

CAMPHORIC ACID.
Lime,
Potass,
Soda,
Baryta,
Ammonia,
Alumina,
Magnesia,

FIXED OILS.
Lime,
Baryta,
Potass,
Soda,
Magnesia,
Oxide of Mercury,
Other metallic oxides,
Alumina.

ALKOHOL.
Water,
Ether,
Volatile oil,
Alkaline sulphurets.

SULPHURETTED HYDROGEN.
Baryta,
Potass,
Soda,
Lime,
Ammonia,
Magnesia,
Zirconia.

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[*] With the omission of all after ammonia.

[†] Ammonia should come before magnesia ; and strontia, glucina, and zirconia should be omitted.

[‡] Magnesia should stand above ammonia, and alumina and silica should be omitted.

[§] Ammonia should stand above magnesia.

[‖] Silica should be omitted, and, instead of it, water and alkohol be inserted.

[¶] Except silica.

[**] With the omission of strontia, metallic oxides, glucina, and zirconia.

[††] Zirconia after alumina.

Relative Attractions at the lowest temperature of Visible Ignition, by Sir H. Davy.

OXYGEN.	CHLORINE.	SULPHUR.	PHOSPHORUS.
Potassium	Potassium	Potassium	Potassium
Sodium	Sodium	*Sodium*	*Sodium*
Barium	Zinc	Iron	Platinum
Boron	Iron	Copper	Zinc
Carbon	Lead	Palladium	Antimony
Manganesum	Silver	Lead	Sulphur
Zinc	Antimony	*Silver*	
Iron	Bismuth		
Tin	Phosphorus		
Phosphorus	Copper		
Antimony	Sulphur		
Bismuth	Mercury		
Lead	Platinum		
Sulphur	Gold		
Arsenic			
Tungstenum			
Azote			
Palladium			
Mercury			
Silver			
Gold			
Platinum			

Cases of Mutual Decomposition.

1. FROM SIMPLE AFFINITY.

Sulphate of potass	-	with	Muriate of baryta
———— soda	-	——	Nitrate of potass
———— ammonia	-	——	Muriate of potass
———— magnesia	-	——	Carbonate of potass
Supersulphate of alumina		——	Muriate of lime
Nitrate of potass	-	——	———— baryta
———— ammonia	-	——	Phosphate of soda
Muriate of baryta	-	——	All the sulphates and nitrates
———— soda	-	——	Carbonate of potass
———— lime	-	——	Subborate of soda
———— ammonia	-	——	Carbonate of potass
Phosphate of soda	-	——	Muriate of ammonia
Subborate of soda	-	——	Carbonate of potass
Nitrate of silver	-	——	Muriate of soda
Acetate of lead	-	——	Citrate of potass
Sulphate of mercury	-	——	Muriate of soda
Soap of potass -	-	——	———— soda
———— soda -	-	——	Sulphate of lime

2. FROM COMPOUND AFFINITY.

Sulphate of baryta	with	Carbonate of potass
———— baryta	——	———— soda
———— potass	——	Muriate of lime
———— soda	——	Ditto
Muriate of baryta	——	Phosphate of soda
Ditto	——	Subborate of soda
Ditto	——	Carbonate of potass
Ditto	——	———— soda
Ditto	——	———— ammonia
Muriate of lime	——	———— ammonia
Phosphate of soda	——	———— lime
Acetate of lead	——	Sulphate of zinc
Ditto	——	Nitrate of mercury.

Cases of Disposing Affinity.

The formation of water by the action of the sulphuric acid on the compound oxides.

The oxidation of metals by water, in consequence of the presence of an acid.

Table of Incompatible Salts *.

SALTS	INCOMPATIBLE WITH
1. Fixed alkaline sulphates....	Nitrates of lime and magnesia Muriates of lime and magnesia
2. Sulphate of lime.............	Alkalies Carbonate of magnesia Muriate of barytes
3. Alum.	Alkalies Muriate of barytes Nitrate, muriate, carbonate of lime Carbonate of magnesia
4. Sulphate of magnesia	Alkalies Muriate of barytes Nitrate and muriate of lime
5. Sulphate of iron..............	Alkalies Muriate of barytes Earthy carbonates
6. Muriate of barytes...........	Sulphates Alkaline carbonates Earthy carbonates

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* That is, salts which cannot exist together in solution, without mutual decomposition.

7. Muriate of lime.............	Sulphates, except of lime Alkaline carbonates Carbonate of magnesia
8. Muriate of magnesia.........	Alkaline carbonates Alkaline sulphates
9. Nitrate of lime..............	Alkaline carbonates Carbonates of magnesia and alumina Sulphates, except of lime.

Table exhibiting the Atomic Weights of the Simple and some Compound Bodies which are connected with Pharmacy.—Extracted from Dr Thomson's First Principles of Chemistry.

	Oxyg. = 1	*Hydr.* = 1
Hydrogen,	0.125	1
Carbon,	0.75	6
Oxygen,	1.	8
Boron,	1.	8
Silicon,	1.	8
Carburetted hydrogen,	1.	8
Water,	1.125	9
Aluminum,	1.25	10
Lithium,	1.25	10
Fluoric acid,	1.25	10
Naphthaline,	1.25	10
Phosphorus,	1.5	12
Magnesium,	1.5	12
Azote,	1.75	14
Carbonic oxide,	1.75	14
Olefiant gas,	1.75	14
Sulphur,	2.	16
Silica,	2.	16
Ammonia,	2.125	17
Sulphuretted hydrogen,	2.125	17
Deutoxide of hydrogen,	2.125	17
Glucinum,	2.25	18
Alumina,	2.25	18
Lithia,	2.25	18
Calcium,	2.5	20
Magnesia,	2.5	20
Phosphorous acid,	2.5	20
Oil gas,	2.625	21
Carbonic acid,	2.75	22
Protoxide of azote,	2.75	22
Alcohol,	2.875	23
Sodium,	3.	24
Boracic acid,	3.	24
Hyposulphurous acid,	3.	24
Nickel,	3.25	26
Cobalt,	3.25	26
Cyanogen,	3.25	26
Hydrocyanic acid,	3.375	27
Iron,	3.5	28
Manganese,	3.5	28
Iridium,	3.5	28
Lime,	3.5	28
Sulphuret of magnesium	3.5	28
Deutoxide of azote,	3.75	30
Copper,	4.	32
Tellurium,	4.	32
Sulphurous acid,	4.	32
Titanium,	4.25	34
Zinc,	4.25	34
Yttrium,	4.25	34
Chlorine,	4.5	36
Oxalic acid,	4.5	36
Sulphuret of calcium,	4.5	36
Protoxide of iron,	4.5	36
Protoxide of manganese,	4.5	36
Muriatic acid,	4.625	37
Sulphuric ether,	4.625	37
Arsenic,	4.75	38
Hyponitrous acid,	4.75	38
Potassium,	5.	40
Selenium,	5.	40
Oxide of copper,	5.	40
Deutoxide of manganese,	5.	40
Peroxide of iron,	5.	40

	Oxyg. = 1	*Hydr.* = 1
Sulphuric acid,	5.	40
Oxide of zinc,	5.25	42
Naphtha,	5.25	42
Strontium,	5.5	44
Antimony,	5.5	44
Protoxide of chlorine,	5.5	44
Tritoxide of manganese,	5.5	44
Protosulphuret of iron,	5.5	44
Nitrous acid,	5.75	46
Lactic acid,	5.75	46
Molybdenum,	6.	48
Potash,	6.	48
Chloride of magnesium,	6.	48
Sulphuret of copper,	6.	48
Perhydrate of iron,	6.25	49
Cerium,	6.25	50
Sulphuret of zinc,	6.25	50
Acetic acid,	6.25	50
Succinic acid,	6.25	50
Sesquisulphuret of iron,	6.5	52
Protoxide of antimony,	6.5	52
Nitric acid,	6.75	54
Arsenious acid,	6.75	54
Sulphuret of arsenic,	6.75	54
Cadmium,	7.	56
Palladium,	7.	56
Deutoxide of antimony,	7.	56
Chloride of calcium,	7.	56
Tin,	7.25	58
Citric acid,	7.25	58
Chloride of sodium,	7.5	60
Persulphuret of iron,	7.5	60
Peroxide of antimony,	7.5	60
Sulphuret of antimony,	7.5	60
Kermes mineral,	7.625	61
Gallic acid,	7.75	62
Arsenic acid,	7.75	62
Sesquisulphuret of arsenic,	7.75	62
Oxide of cadmium,	8.	64
Chloride of iron,	8.	64
Bisulphuret of copper,	8.	64
Tartaric acid,	8.25	64
Protoxide of tin,	8.25	64
Chloride of copper,	8.5	68
Barium,	8.75	70
Tannin,	8.75	70
Bismuth,	9.	72
Suboxide of copper,	9.	72
Hyposulphuric acid,	9.	72
Deutosulphuret of potash,	9.	72
Uric acid,	9.	72
Oil of turpentine,	9.125	73
Peroxide of tin,	9.25	74
Chloric acid,	9.5	76
Dichloride of calcium,	9.5	76
Chloride of potassium,	9.5	76
Barytes,	9.75	78
Oxide of bismuth,	10.	80
Disulphuret of copper,	10.	80
Chloride of antimony,	10.	80
Sulphuret of barium,	10.75	86
Tritosulphuret of potass,	11.	88
Fuming sulphuric acid,	11.125	89
Gum,	11.25	90
Perchloric acid,	11.5	92
Protochloride of tin,	11.75	94
Platinum,	12.	96
Perchloride of iron,	12.5	100
Lead,	13.	104
Sacclactic acid,	13	104
Quadrosulphuret of potass,	13.	104
Chloride of barium,	13.25	106
Silver,	13.75	106
Protoxide of lead,	14.	112
Deutoxide of lead,	14.5	116
Oxide of silver,	14.75	118
Peroxide of lead,	15.	120
Protosulphuret of lead,	15.	120
Benzoic acid,	15.	120
Iodine,	15.5	124
Dichloride of antimony,	15.5	124
Perchloride of tin,	16.25	130
Chloride of lead,	17.5	140
Chloride of silver,	18.25	146

	Oxyg. = 1	Hydr. = 1		Oxyg. = 1	Hydr. = 1
Iodic acid, -	20.5	164	Persulphuret of mercury, -	29.	232
Gold, -	25.	200	Chloride of mercury,	29.5	236
Mercury, -	25.	200	Margaric acid,	33.	264
Uranium, -	26.	208	Bichloride of mercury,	34.	272
Protoxide of mercury,	26.	208	Oleic acid, -	36.	288
Peroxide of mercury,	27.	216	Morphia, -	40.25	322
Protosulphuret of mercury,	27.	216	Picrotoxia, -	45.	360
Disulphuret of lead,	28.	224	Strychnia, -	47.5	380
			Brucia, -	51.5	412

Table of the Atomic Weights of Salts used in Pharmacy.—Extracted from the General Table of Dr Thomson.

	Atoms. a.b.w.	Weight of Acid.	Base.	Dry salt.	Water.	Crystal.
Alumina, sulphate,	1.1.7	5	2.25	7.25	7.875	15.125
Alum, sulph. alum. 3 sulph. pot. 1,	4.4.25	20	12.75	32.75	28.125	60.875
—— sulph. alum. 3 sulph. amm. 1,	4.4.25	20	8.875	28.875	28.125	57.000
—— sulph. alum 3, sulph. sod. 1,	4.4.25	20	10.75	30.75	28.125	58.875
Ammonia, acetate,	1.1.7	6.25	2.125	8.375	7.875	16.25
—— carbonate,	1.1.	2.75	2.125	3.875	——	3.875
—— sesquicarbonate,	1½.1.1	4.125	2.125	6.250	1.125	7.375
—— bicarbonate,	2.1.1	5.5	2.125		1.125	8.75
—— muriate,	1.1.0	4.625	2.115	6.75	——	6.75
—— nitrate,	1.1.1	6.75	2.125	8.875	1.125	10.
Antimony, hydrosulphuret (Kermes mineral,)	1.1.0	2.125	5.5	7.625	——	7.625
—— potash-tartrate,	2.4.2	16.5	25.5	32.	2.25	4.25
Barytes, carbonate,	1.1.0	2.75	9.75	12.5	——	12.5
—— muriate,	1.1.1	4.625	9.75	14.395	1.125	15.500
—— sulphate,	1.1.0	5.	9.75	14.75	——	14.75
Bismuth, nitrate,	1.1.3	6.75	10.	16.75	3.375	20.125
—— dinitrate,	1.2.2	6.75	20.	26.75	2.25	29.
Copper, acetate,	1.1.1	6.25	6.	11.25	1.125	12.375
—— diacetate,	1.2.6	6.25	10.	16.25	6.75	23.
—— subsesquiacetate,	1.1½.3	6.25	7.5	13.75	3.375	17.125
—— triacetate,	1.3.2	6.25	15.	21.25	2.25	23.5
—— muriate,	1.1.2	4.625	5.	9.625	2.25	11.875
—— sulphate,	1.1.5	5.	5.	10.	5.625	15.625
—— ammonio-sulph. sulph. cop. 1, s. amm. 1,	2.2.6	10.	7.125	17.125	6.75	23.875
Iron acetate,	1.1.3	6.25	4.5	10.75	3.375	14.125
—— carbonate,	1.1.0	2.75	4.5	7.25	——	7.25
—— muriate,	1.1.3	4.625	4.5	9.125	3.375	12.5
—— nitrate,	1.1.7	6.75	4.5	11.25	7.875	19.125
—— persesquinitrate,	1½.1.8	10.125	5.	15.125	9.	24.125

	Atoms.	Weight of				
	a.b.w.	Acid.	Base.	Dry salt.	Water.	Crystal.
Iron, sulphate,	1.1.7	5.	4.5	9.5	7.875	17.375
—— persesquisulphate,	1½.1.x	7.5	5.	12.55	x	x
—— tartrate,	1.1.2	8.25	4.5	12.7	2.25	15.
—— ammonio-permuriate, persesquinitr. iron 1, mur. amm. 1,	2½.2.0	11.5625	7.125	18.6875		18.6875
Lead, acetate,	1.1.3	6.25	14.	20.25	3.375	23.625
—— diacetate,	1.2.10	6.25	28.	34.25	11.25	45.5
—— trisacetate,	1.3.2	6.25	42.	48.25	2.25	50.5
—— carbonate,	1.1.0	2.75	14.	16.75		16.75
Lime, carbonate,	1.1.0	2.75	3.5	6.25	——	6.25
—— muriate,	1.1.6	4.625	3.5	8.125	6.75	14.875
—— phosphate,	1.1.0	3.5	3.5	7.	——	7.
—— sulphate anhydrous,	1.1.0	5.	3.5	8.5	——	8.5
—— —— crystals,	1.1.2	5.	3.5	8.5	2.25	10.75
—— tartrate,	1.1.4	8.25	3.5	11.75	4.5	16.25
Magnesia, carbonate,	1.1.3	2.75	2.5	5.25	3.375	8.625
—— —— anhydrous,	1.1.0	2.75	2.5	5.25	——	5.25
—— muriate,	1.1.5	4.625	2.5	7.125	5.625	12.75
—— sulphate,	1.1.7	5.	2.5	7.5	7.875	15.375
—— ammonio-phosph. ph. mag. 1, ph. am. 1,	2.2.4	7.	5.625	11.625	4.5	16.125
Mercury, acetate,	1.1.4	6.25	26.	32.25	4.5	36.75
—— nitrate,	1.1.2	6.75	26.	32.75	2.25	35.
—— pernitrate,	1.1.0	6.75	27.	33.75	——	33.75
—— sulphate,	1.1.2	5.	26.	31.	2.25	33.25
—— persulphate,	1.1.0	5.	27.	32.	——	32.
Potash, acetate,	1.1.2	6.25	6	12.25	2.25	14.5
—— binacetate,	2.1.6	12.5	6	18.5	6.75	25.25
—— binarseniate,	2.1.1	15.5	6	21.5	1.125	22.625
—— carbonate,	1.1.2	2.75	6	8.75	2.25	11.
—— sesquicarbonate,	1½.1.6	4.125	6	10.125	6.75	16.875
—— bicarbonate,	2.1.1	5.5	6	11.5	1.125	12.625
—— nitrate,	1.1.0	6.75	6	12.75	——	12.75
—— oxalate,	1.1.1	4.5	6	10.5	1.125	11.625
—— binoxalate,	2.1.2	9.	6.	15.	2.25	17.25
—— quadroxalate,	4.1.7	18.	6	22.	7.875	31.875
—— sulphate,	1.1.0	5.	6	11.	——	11.
—— bisulphate,	2.1.2	10.	6	16.	2.25	18.25
—— tartrate,	1.1.2	8.25	6	14.25	2.25	16.5
—— bitartrate,	2.1.2	16.5	6.	22.5	2.25	24.75
Silver, nitrate	1.1.0	6.75	14.75	21.5		21.5
Soda, biborate, (borax,)	2.1.8	6.	4	10	9.	19.
—— carbonate,	1.1.10	2.75	4	6.75	11.25	18.
—— sesquicarbonate,	1½.1.2	4.125	4	8.125	2.25	10.375
—— bicarbonate,	2.1.1	5.5	4	9.5	1.125	10.625
—— phosphate,	1.1.12	3.5	7	7.5	13.5	21
—— biphosphate,	2.1.5½	7.	4.	11.	3.9375	14.9375
—— sulphate,	1.1.10	5.	4.	9.	11.25	20.25
—— tartrate,	1.1.1	8.25	4	12.25	2.25	14.5
—— urate,	1.1.1	9.	4	13.	1.125	14.125
—— ammonio-phosphate, phos. sod. 1, phos. am. 1,	2.2.16	7.	6.125	13.125	18.	31.125
—— potash-tartrate, tart. of pot. 1, tart. of soda 1,	2.28	16.5	10.	26.5	9.	35.5

	Atoms. a.b.w.	Weight of Acid.	Base.	Dry salt.	Water.	Crystal.
Soda, potash-boro-tartrate, bibor. of soda 1, bitartrate of potash 1,.........	4.2.16	18.	10	28.	18.	46.
Tin, bimuriate, ...	2.1.3	9.25	9.25	18.5	3.375	21.875
Zinc, acetate,..................	1.1.7	6.25	5.25	11.5	7.875	19.375
—— carbonate,...............	1.1.1	2.75	5.25	8.	1.125	9.125
———— anhydrous,	1.1.0	2.75	5.25	8	———	8
—— sulphate, ...	1.1.7	5	5.25	10.25	7.875	18.125

Composition of some Organic Bodies, according to Berzelius.

	Oxyg.	*Hydr.*	*Carb.*	*Oxyg.*	*Hydr.*	*Carb.*	*Capacity of saturation.*
Benzoic acid,............	1 *o*+	3 *h*+	5 *c*	20.02	5.27	74.71	6.69
Gallic acid,...........	1 *o*	2 *h*	2 *c*	38.02	5.02	56.96	12.34
Tannin from galls,......	2 *o*	3 *h*	3 *c*	45.00	4.45	50.55	3.718
Succinic acid,............	3 *o*	4 *h*	4 *c*	47.923	4.218	47.859	15.9743
Acetic acid,...............	3 *o*	6 *h*	4 *c*	46.934	6.195	46.871	15.63
Sugar of milk, ...	4 *o*	8 *h*	5 *c*	48.348	6.385	45.267	
Sugar,.........................	10 *o*	21 *h*	12 *c*	49.083	6.802	44.115	9.98
Potatoe starch, ...	6 *o*	13 *h*	7 *c*	49.583	7.090	43.327	
Gum Arabic,.............	12 *o*	24 *h*	13 *c*	51.456	6.792	41.752	
Citric acid,................	1 *o*	1 *h*	1 *c*	55.096	3.634	41.270	13.585
Tartaric acid,.............	5 *o*	5 *h*	4 *c*	59.200	3.912	36.888	11.976
Saclactic acid, ...	4 *o*	5 *h*	3 *c*	60.818	5.018	34.164	7.6
Oxalic acid, ...	6 *o*	1 *h*	4 *c*	66.534	0.244	33.222	22.

According to Gay-Lussac and Thenard.

	Carbon.	*Oxygen.*	*Hydrogen.*	
Wax, ...	81.79	5.54	12.67	
Olive oil, ...	77.21	9.43	13.36	
Copal, ...	76.81	10.61	12.58	
Rosin, ...	75.94	13.34	10.72	
Oak wood, ...	52.53	41.78	5.69	
Beech wood, ...	51.45	42.73	5.82	
Fecula, ...	43.55	49.68	6.77	
Sugar, ...	42.47	50.63	6.90	
Gum Arabic, ...	44.23	50.84	6.93	
Sugar of milk, ...	38.825	53.834	7.341	
Acetic acid,.........................	50.22	44.15	5.63	
Citric acid, ...	33.81	59.86	6.33	
Tartaric acid, ...	24.05	69.32	6.53	
Mucous acid, ...	33.69	62.67	3.62	
Oxalic acid, ...	26.57	70.69	2.74	
				Nitrogen.
Gelatin, ...	47.881	27.207	7.914	16.998
Albumen, ...	52.883	23.872	7.540	15.705
Fibrin, ...	53.360	19.865	7.021	19.934
Cheese, ...	59.781	11.409	7.429	21.381

Organic Acids, according to Dr Thomson.

		Hydrog.	Carb.	Oxyg.	
Oxalic,	— $2c+3o$	——	40	80	
Formic,	$1h+2c+3o$	2.72	32.42	64.86	
Saclactic,	$2h+3c+4o$	3.84	34.61	61.55	
Acetic,	$2h+4c+3o$	4.	48.	48.	
Succinic,	$2h+4c+3o$	4	48	48.	
Citric,	$2h+4c+4o$	3.45	41.38	55.17	
Tartaric,	$2h+4c+5o$	3.03	36 36	60.61	
Benzoic,	$2h+5c+1o$	5.	75.	20.	
Uric,	— $6c+1o+2n$	——	50.	11.11	38.89 *Nitrogen.*

Table of the Solubility of Salts in 100 *parts of water, at*

Acids.	60°.	212°.
Arsenic,	16.6	50.
Arsenious,	1.25	6.
Benzoic,	0.208	4.17
Boletic,	0.55	
Boracic,	2.8	8.
Camphoric,	1.04	9.1
Chromic,	unknown.	
Citric, Vauquelin,	133.	200.
Gallic,	8.3	66.
Kinic,	20.	
Laccic,	very soluble.	
Lactic,	very soluble.	
Malic,	very soluble.	
Mellitic,	sparingly.	
Molybdic,		0.1
Moroxylic,	0.015	0.035
Mucic, saccholactic,	0.84	1.25
Oxalic,	50.	100.
Phosphoric,	20.	much more.
Rheumic,	50.	
Suberic,	1.25	2.63 at 140.
Succinic,	4.	50.
Tartaric,	very soluble.	
Tungstic,	insoluble.	
Uric,	0.0589	0.087
Zumic,	very soluble.	

Salifiable Bases.

Potassa, (real)	41.	56.5
Soda, (real)	more soluble than potassa.	
Lithia,	very soluble.	
Baryta, crystallized,	57.	watery fusion.
Strontia, crystallized,	19.2	50.

Lime, Mr Dalton, at 32° 0.15 ; 130° .103 ;	0.1287	0.0789
Magnesia, Dr Fyfe,	0.0194	0.00277

Salts.

Alum, ammoniacal, Dr Thomson,	9.37	
—— potash, ditto,	14.79	133.
—— soda, ditto,	327.6	
Ammonia, acetate,	very soluble.	
——— carbonate,		
——— sesquicarbonate,	50.	100.
——— bicarbonate,		decomposed.
——— camphorate,	1.	33.
——— muriate,	33.	100.
——— phosphate,	15.	25.
——— phosphite,	50.	+
——— sulphate,	50.	100.
——— sulphite,	100.	
Antimony, (tartar emetic,)	D. 6.6	33.
Barium, chloride,	34.	59.
Baryta, acetate,	very soluble.	
—— carbonate,	insoluble.	
—— camphorate,	0.16	
—— chlorate,	25.	+
—— nitrate,	8.	25.
—— phosphate,	25.	+
—— phosphite,	0.25	
—— sulphate,	0.002	
Copper, acetate,	very soluble.	
——— sulphate,	25.	50.
Lead, chloride,	4.5	
—— acetate,	25.	+
—— sulphate,	0.08	
—— tartrate,	insoluble.	
Iron, sulphate,	50.	130.
—— muriate,	very soluble.	
Calcium, chloride,	400.	+
Lime, acetate,	very soluble.	
—— carbonate,	insoluble.	
—— camphorate,	0.5	
—— citrate,	insoluble.	
—— nitrate,	400.	
—— phosphate,	insoluble.	
—— sulphate,	0.2	0.22
—— sulphite,	0.125	
Lithia, carbonate,	1.0	
Magnesium, chloride,	100.	
Magnesia, acetate,	very soluble.	
——— carbonate,	0.04	0.0111
——— nitrate,	100.	+

Magnesia, phosphate,	6.6	
——— sulphate,	100.	644.
——— sulphite,	5.	
Mercury, bichloride,	5.	33.
——— chlorate,	25.	
Potassium, chloride,	34.	50.
Potass, acetate,	100.	
——— carbonate,	100.+	
——— bicarbonate,	25.	decomposed.
——— camphorate,	33.	+
——— chlorate,	5.9	40.
——— perchlorate,	2.	
——— ferrocyanate,	33.	100.
——— hydrocyanate,	very soluble.	
——— iodate,	7.5	
——— hydriodate,	very soluble.	
——— phosphate,	very soluble.	
——— phosphite,	33.	+
——— saccholactate,		12
——— sulphate,	6.25	20
——— bisulphate,	50.	100.+
——— sulphite,	100.	
——— superoxalate,		10.
——— supertartrate,	1.6	3.3
——— tartrate,	25.	
Silver, chloride,	0.08	
——— nitrate,	100.	
Sodium, chloride,	35.42	40
Soda, acetate,	very soluble.	
——— carbonate,	50.	100.+
——— bicarbonate,	much less.	decomposed.
——— borate (borax,)	5.	16.8
——— with bitartrate of potass,	20.	+
——— chlorate,	35.	+
——— ferrocyanate,	22.	+
——— hydriodate,	very soluble.	
——— nitrate,	33.	100.
——— phosphate,	25.	50.
——— saccholactate,		20.
——— sulphate,	37.	125.
——— bisulphate,	50.	
——— sulphite,	25.	100.
Strontian, chloride,	150.	unlimited.
——— acetate,		40.
——— carbonate,	insoluble.	
——— nitrate,	100.	200.
——— oxalate,	$0\frac{1}{15}$.	
——— phosphate,		insoluble.
——— sulphate,	0.	0.02
Zinc, sulphate,	40.	+

Anomaly in the different Solubility of Salts at different Temperatures.

It was believed that the solubility of most salts increased with the increase of temperature. But Gay Lussac shewed that the solubility of sulphate of soda increased from 32° to 90°, when it reached its maximum, and then decreased to 218°, its boiling point. Afterwards Brandes found that the solubility of chloride of barium was still more anomalous, as it increases from 13° Fahr. to 122°, decreases to 145°, and again increases to its boiling point. I have ascertained a similar anomaly in nitrate of barytes, so that it is not improbable that it exists in regard to many salts. The following lines shew the progression of solubility in those salts in 100 parts of water.

Sulphate of Soda.

Dry,............	5.02	10.12	28.11	50.65	46.82	42.05
Crystallized,....	12.17	28.38	99.48	322.12	262.35	
Temp. Fahr. ...	32°	52°	76°	90°	122°	218°

Chloride of Barium.

Salt,....	39.6	42.2	43.7	51.	65.	48.	63.	65.	72.
Temp...	61°	68	72.5	100	122	145	167	190	212

Other Substances soluble in Water.

Sugars,—an equal weight at 60°, and any quantity at a boiling heat.
Mucilage, gum,—abundantly at 60°, but more so at 212°.
Starch,—insoluble at 60°, very soluble at 212°.
Vegetable jelly,—sparingly at 60°, very soluble at 212°.
Gelatine,—very soluble at 212°, gelatinizing at 60°.
Albumen, uncoagulated,—soluble at 60°, coagulating at 160°.
Fibrin, uncoagulated,—soluble at 60°, coagulating at 160°.
Urea,—very soluble.
Extractive, tannin,—very soluble.

Substances insoluble, or very sparingly soluble, in Water.

Earths and metallic oxides.
Chlorides of lead and mercury, (calomel).
Earthy and metallic carbonates.
Sulphates of baryta, strontia, and lime, and subsulphate of mercury.
Phosphates of baryta, strontia, lime, magnesia, and mercury.
Fluate of lime.
Subacetate of copper.
Subsalts in general.
Fixed oils.
Volatile oils.
Camphor.
Resins.
Caoutchouc.
Wax.
Suberin, lignin.

Table of the Solubility of Saline Substances in 100 *parts of Alcohol.*

	Temperature.	
Acid, boracic,	176°	20
—— succinic,		74
Ammonia, muriate,	176	7.
———— nitrate,	176	89.2
Alumina, muriate,	54	100
———— nitrate,	54	100
Cobalt, nitrate,	54	100
Copper, acetate,	176	7.5
——— muriate,	176	100
Iron, persulphate,	very soluble.	
—— muriate,	176	100
Lime, muriate,	176	100
—— nitrate,	176	125
Magnesia, muriate,	176	547
Mercury, muriate,	176	88.3
Potass, arseniate,	176	3.75
——— nitrate,	176	2.9
——— superoxalate,		3.
——— tartrate,		0.04
Soda, acetate,	176	46
—— arseniate,	176	1.7
Siver, nitrate,	176	41.7
Zinc, muriate,	54	100.

Other Substances very soluble in Alcohol.

All the acids except the sulphuric and nitric, which decompose it, and the phosphoric and metallic acids, which are insoluble.
All the alkalies, potass, soda, and ammonia.
All the alcaloids, morphia, cinchonia, quinia, strychnia, picrotoxia, &c.
All the alkaline soaps.
Sugar.
Most of the resins.
Castor oil. Elain.
Volatile oils.
Camphor.
Extractive, tannin.
Urea.

Substances insoluble in Alcohol.

Earths.
Metallic oxides.
Phosphoric and metallic acids.
Almost all the sulphates and carbonates.
The nitrates of lead and mercury.

The muriates of lead, silver, and soda.
The sub-borate of soda.
The tartrate of soda and potass, and the supertartrate of potass.
Fixed oils, wax and caoutchouc.
Earthy soaps.
Gum, starch, suber, lignin.
Gelatin, albumen, and fibrin.

Table of the Solubility of Fats in 100 *parts of Alcohol and Sulphuric Ether. By P. F. G. Boullay.*

	Alcohol, sp. gr. 0.828		Ether.
	48 Fahr.	74 boiling.	48 Fahr.
Hogs lard,	1.04	1.74	25
Mutton suet,	0.69	1.39	10
Spermaceti,	1.39	8.33	20

Table of the Solubility of Fixed Fluid Oils in 100 *parts of Alcohol and Acetic Ether at* 55° *Fahr. By L. A. Planche.*

	Alcohol, sp. gr. 0.828.	Acetic Ether.
Castor oil,	every proportion.	800 and upwards.
Poppy seed oil, a year old,	0.8	
Linseed oil,	0.6	50.
Walnut oil,	0.6	50.
Poppy seed oil, new,	0.4	33.
Beech mast oil,	0.4	40.
Olive oil,	0.3	20.
Oil of sweet almonds,	0.3	25.
Oil of bitter almonds,	0.3	
Nut oil,	0.3	14

Proportion of Oil and Suet in various Fats according to Braconnot.

	Oil.	Suet.
Melted butter, summer,	60	40
——————— winter,	35	65
Hogs lard,	62	38
Beef marrow,	24	76
Mutton marrow,	74	26
Goose grease,	72	32
Turkey grease,	74	26
Olive oil,	72	28
Oil of almonds,	76	24
——— colsa,	54	46

Table of Efflorescent Salts (Cadet de Vaux.)

288 grains of	in days	lost grains.
Sulphate of soda,	61	203
Phosphate of soda,	39	91
Carbonate of soda,	51	86

Table of Deliquescent Salts (Cadet de Vaux.)

288 grains of	in days	absorbed
Acetate of potass,	146	700
Muriate of lime,	124	684
——— manganese,	105	629
Nitrate of manganese,	89	527
——— zinc,	124	495
——— lime,	147	448
Muriate of magnesia,	139	441
Nitrate of copper,	128	397
Muriate of antimony,	124	388
——— alumina,	149	342
Nitrate of alumina,	147	300
Muriate of zinc,	76	294
Nitrate of soda,	137	257
——— magnesia,	73	207
Acetate of alumina,	104	202
Supersulphate of alumina,	121	202
Muriate of bismuth,	114	174
Superphosphate of lime,	93	165
Muriate of copper,	119	148

Table shewing the Proportion of Water of Crystallization in the Salts used in Pharmacy.

1. *Anhydrous.*

Ammonia, carbonate.
——— muriate.
——— tartrate.
Barytes, carbonate.
——— nitrate.
——— sulphate.
Copper, dicarbonate.
Lead, carbonate.
——— nitrate.
——— phosphate.
——— sulphate.
——— tartrate.
Lime, carbonate.
——— phosphate.
——— sulphate.
Iron, carbonate.
Magnesia, carbonate.
Mercury, subsesquicarbonate.
——— pernitrate.
——— phosphate.
——— persulphate.
——— tartrate.
Potash, nitrate.
——— sulphate.
Silver, carbonate.
——— nitrate.
——— sulphate.
Soda, nitrate.
——— oxalate.
Zinc, carbonate.

2. *One Atom of Water.*
Alumina, acetate.
Ammonia, sesquicarbonate.
——— bicarbonate.
——— nitrate.
Barytes, sulphate.
——— muriate.
Copper, acetate.
——— dicarbonate. Var. *b.*
Lead, hyponitrite.
Potash, binarseniate.
——— bicarbonate.
——— oxalate.
——— phosphate.
Soda, bicarbonate.
—— urate.
Zinc, carbonate.

3. *Two Atoms of Water.*
Ammonia, oxalate.
Bismuth, dinitrate.
Copper, trisacetate.
——— muriate.
Iron, tartrate.
Lime, sulphate.
Lead, trisacetate.
Magnesia, tartrate.
Mercury, nitrate.
——— sulphate.
Potash, acetate.
——— carbonate.
——— bisulphate.
——— tartrate.
——— bitartrate.
Soda, tartrate.
—— subsesquicarbonate.

4. *Three Atoms of Water.*
Alumina, muriate.
Bismuth, nitrate.
Copper, subsesquiacetate.
Iron, acetate.
Iron, muriate.
Potash, benzoate.
Magnesia, carbonate.
Tin, bimuriate.

5. *Four Atoms of Water.*
Lime, tartrate.
Mercury, acetate.

6. *Five Atoms of Water.*
Copper, sulphate.
Magnesia, acetate.
——— muriate.

7. *Six Atoms of Water.*
Copper, diacetate.
—— acetate.
—— muriate.
—— nitrate.
Magnesia, nitrate.
Potash, binacetate.
——— sesquicarbonate.
Soda, acetate.

8. *Seven Atoms of Water.*
Alumina, sulphate.
Ammonia, acetate.
Copper, nitrate.
Iron, nitrate.
—— sulphate.
Magnesia, sulphate.
Zinc, acetate.
—— sulphate.

9. *Eight Atoms of Water.*
Iron, persesquinitrate.
Soda, borate, (Borax.)
—— arseniate.

10. *Ten Atoms of Water.*
Lead, diacetate.
Soda, carbonate.
—— sulphate.

11. *Twelve Atoms of Water.*
Soda, phosphate.

Metal.	*Prussiated Alkalies.*	*Tincture of Galls.*	*Water impregnated with Sulphuretted Hydrogen.*	*Hydrosulphurets.*
Antimony	White	A white oxide from dilution	Orange	Orange
Arsenic	White	Little change	Yellow	Yellow
Bismuth	White	Orange	Black	Black
Cadmium	White	No change	Orange	Orange
Cerium	White	Yellowish		Brown, becoming deep green
Chrome	Green	Brown		Green
Cobalt	Grass-green	Yellowish-white	Not precipitated	Black
Columbium	Olive	Orange		Chocolate
Copper per-salts	Bright reddish-brown	Brownish	Black	Black
Gold	White	Solution turned green. Precipitate brown of reduced gold	Yellow	Yellow
Iridium	None; colour discharged	None; colour discharged		
Iron 1 proto-salts	White changing to blue	No precipitate	Not precipitated	Black
Iron 2 per-salts	Deep blue	Black		
Lead	White	White	Black	Black
Manganese	White	No precipitate	Not precipitated	White
Mercury	White changing to yellow	Orange-yellow	Black	Brownish-black
Molybdenum	Brown	Deep brown	Brown	
Nickel	Apple-green	Greyish white	Not precipitated	Black
Osmium		Purple changing to vivid blue		
Palladium	Olive *; deep orange †		Dark brown	Dark brown
Platinum	No precipitate; but orange by prussiate of mercury	Dark green, becoming paler	Precipitated in a metallic state	
Rhodium	No precipitate			No precipitate
Silver	White	Yellowish-brown	Black	Black
Tellurium	No precipitate	Yellow		Blackish
Tin	White	No precipitate	Brown	Black
Titanium	Reddish-brown	Reddish-brown	Not precipitated	Grass-green
Tungsten				
Uranium	Blood-red	Chocolate		Brownish-yellow
Zinc	White	No precipitate	Yellow	White

* Chenevix. † Wollaston.

*Natural Classification of Vegetable Principles by Dr Brandes**, 1819.

Family I.

G. 1. Lignin.
2. Medullin, of John.
3. Cotton, of John.
4. Suberin, of Chevreuil.

Family II.

5. Starch.
6. Fibrous Starch, of Einhoff and Giese.
7. Inulin, of Funke, John and Giese.
8. Datiscin, of Braconnot.
9. Menyanthin, of Trommsdorf in the Menyanthes trifoliata.
10. Fungin, of Braconnot.

Family III.

11. Ulmin, of Klaproth.
12. Tragacanth, of Bucholz, Meissner and Brandes.
13. Bassorin, of Vauquelin.
14. Prunin, of John and Bostock.

Family IV.

15. Gum.
16. Mucus. Pfaff.

Family V.

17. Sugar.
    Species 1. Cane-sugar.
    2. Grape-sugar. Proust.
    3. Starch-sugar. Kirckhoff.
    4. Honey-sugar.
18. Mannite ? Bucholz.
19. Glycion. Robiquet.

Family VI.

20. Asparagin. Vauquelin, Robiquet.
21. Olivile. Pelletier.

Family VII.

22. Indigo. Chevreuil, Dobereiner.

Family VIII.

23. Jelly.
    Species 1. Vegetable jelly, in subacid fruits.
    2. Animal jelly. Fourcroy.
24. Gluten. Beccaria.

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* See Grundriss der Pharmacie mit vorzüglicher Hinsicht auf die pharmaceutische Chemie von C. F. Bucholz: aufs neue herausgegeben von Rudolph Brandes, W.W.D. 8vo, Erfurt, 1819.

25. Albumen. Fourcroy, Bucholz, Proust, Trommsdorff.
26. Vegeto-animal principle of pulse. Einhoff.
27. Pollenin. John.
28. Orlean from the Bixa orellana.

Family IX. Extractive principles.

29. Bitter extractive with slight agency.
30. Bitter extractive with great agency.
31. Aloesin. Trommsdorff, Pfaff, Braconnot.
32. Bitter narcotic extractive. Pfaff.
33. Scillitin. Vogel.
31. Emetin. Pelletier, Bucholz and Brandes.
35. Caffein. Chenevix, Paysse.
36. Erythrodenin. Bucholz, Dobereiner.
37. Cerein, (Polychroit.) Vogel, Bouillon La Grange.
38. Valerianin. Trommsdorff.
39. Tannin.

Family X.

SECTION I.—Uncrystallizable.

40. Rhabarbarin. Trommsdorff.

SECTION II.—Crystallizable.

41. Hæmatoxolin. Chevreuil.

Family XI.

42. Cinchonin. Duncan, Gomez.
    Species 1. Cinchonia. Pelletier.
    2. Quinia. Pelletier.

Family XII.

43. Daphin. Vauquelin.
44. Picrotoxia. Boullay.
45. Morphia. Sertuerner.
46. Strychnia.

Family XIII.

47. Fixed oils.
48. Vegetable butters.
49. Wax.
    Species 1. Cerin. John, Bucholz, Brandes.
    2. Myricin. John, Bucholz, Brandes.

Family XIV.

50. Resinoids. Gehlen.

Family XV.

51. Resins.
52. Balsams.

Family XVI.

53. Caoutchouc.

Family XVII.

Section i.—Fluid at common temperatures.

54. Volatile oils.

Section ii.—Solid at common temperatures.

55. Camphor.
56. Anemonin. Heyer.
57. Inulin. Funke.

Family XVIII.

58. Narcotic principles.
59. Acrid principles.

It is evident that many additions, and some corrections, might be made; but it is transcribed without alteration, except in a single instance, to do justice to myself.

Classification of the Vegetable Materia Medica on Chemical Principles. By Prof. Pfaff.*

Class i. Mucilaginous Medicines.

Order 1. Gums.

1. Gummi Arabicum et Senegalense.
2. Gummi tragacantha.

Order 2. Mucous Medicines.

3. Althææ radix et folia.
4. Cydoniorum semina.
5. Lini semina.
6. Malvæ herba et flores.
7. Fœni Græci semina.
8. Psylii semina.

Class ii. Amylaceous Medicines.

1. Amylum.
2. Saga grana.
3. Salep radices.
4. Marantæ arundinaceæ amylum.
5. Hordei semina.

Class iii. Gelatinous Medicines.

1. Ichthyocolla.

Class iv. Saccharine Medicines.

1. Saccharum album.
2. Mel.
3. Manna.
4. Saccharum lactis.
5. Mellago graminis.

Class v. Sweet Extractive.

1. Gycyrrhizæ radix.
2. Graminis radix.
3. Dauci carotæ radix.
4. Cassia fistula.
5. Polypodii radix.

Class vi. Oleaginous Medicines.

A. Vegetable.

Order 1. Fluid at ordinary temperatures.

1. Oleum Olivarum.
2. Oleum amygdalæ.
3. Oleum lini.
4. Oleum papaveris albi.
5. Oleum ricini.

Order 2. Solid Oils. Stearin.

6. Cacao nuclei.
   - *a.* Butyrum cacao.
   - *b.* Chocolata.
7. Oleum baccarum lauri.
8. Oleum macis.

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* See System der Materia Medica nach chemischen Principien. v. Bände und Supplt. Leipzig, 1814–21.

B. Animal.

9. Axungia porci.
10. Sevum ovillum.
11. Oleum ovorum.

C. Adipocerous.

12. Spermaceti.

D. Waxy.

13. Cera.
    a. Flava.
    b. Alba.

Class vii. Bitter Extractive.

Order 1. With weak powers.

1. Quassiæ lignum et radix.
2. Gentiana rubra.
3. Centaurium minus.
4. Menyanthes trifoliata.
5. Carduus benedictus.
6. Fumaria officinalis.
7. Polygalæ amaræ radix et herba.
8. Leontodi taraxaci herba et radix.

Order 2. With strong power.

9. Colombæ radix.
10. Angusturæ veræ cortex.
11. Quassiæ simaroubæ cortex.
12. Lichen Islandicus.

Order 3. Of great intensity.

13. Nux vomica.
14. Faba S^ti^ Ignatii.
15. Angusturæ spuriæ cortex.

Class viii. Acrid Extractive.

1. Polygalæ Senegæ radix.
2. Saponariæ officinalis radix.

Class ix. Colouring Extractive.

1. Rubiæ tinctorum radix.

Class x. Astringent Principle.

1. Gallæ Turcicæ.
2. Catechu.
3. Kino.
4. Quercus cortex.
5. Tormentillæ radix.
6. Hæmatoxyli Campechiani lignum.
7. Cortex granatorum.
8. Flores balaustiorum.
9. Radix bistortæ.
10. Myrobalanæ.
11. Baccæ myrtillorum.
12. Symphitis majoris radix.
13. Lysimachiæ purpureæ herba et flores.
14. Rosarum rubrarum flores.
15. Ratanhiæ radix.
16. Caryophyllatæ radix.
17. Putamina nucum juglandum.

Class xi. Cinchonin and astringency intimately combined.

1. Cinchonæ officinalis cortex.
2. Cinchona flava.
3. Cinchona rubra.
4. Cinchona Cariboea.
5. Cinchona S^{ti} Luciæ.
6. Cinchona Pithou.
7. Cinchona nova.
8. Lichen parieitinus.
9. Cortex Cabarro Alcorinoco.

Class xii. Caffein.

1. Caffææ baccæ.

Class xiii. Rhabarbarin.

Rhæi radix.
Rhapontici radix.

Class xiv. Aloesin.

1. Aloes socotorina.
2. Aloes hepatica.

Class xv. Picromel.

1. Fel tauri.

Class xvi. Emetics.

1. Ipecacuanhæ radix.

Class xvii. Resinous.

Order 1. Indifferent Resins.

1. Lacca.
2. Sanguis draconis.
3. Resina communis.
4. Colophonium.

Order 2. Aromatic Resins.

5. Sandarac.
6. Mastiche.
7. Olibanum. Thus.
8. Elemi.
9. Tacamahaca.

Order 3. Balsamic Resins.

10. Benzoes.

11. Storax.

Order 4. Guaiacin.

12. Guaiac.

Order 5. Purging resins.

13. Jalapæ radix.
14. Scammonium.
15. Agaricus albus.
16. Gratiolæ officinalis herba.

Allied.

17. Sennæ folia.
18. Bryoniæ albæ radix.
19. Colocynthides.

Order 6. Acrid Resins.

A. Strictly Acrid Resins.

20. Euphorbium.
21. Piper nigrum et album.
22. Capsicum annuum.
23. Daphnes Mezerei cortex et baccæ.
24. Pyrethri veri radix.
25. Arnicæ montanæ flores, herba et radix.
26. Asari Europæi radix.

B. Cantharidin.

27. Cantharides.

C. Helleborin.

28. Hellebori nigri radix.
29. Hellebori hyemalis radix.

Class xviii. Gum Resins.

A. Containing volatile oil.

1. Gummi ammoniacum.
2. Assafœtida.
3. Galbanum.
4. Sagapenum.
5. Myrrh.
6. Opoponax.

B. Containing no volatile oil.

7. Gummi guttæ.
8. Chelidonii majoris herba.

Class xix. Natural Resinous Juices.

Order I. Fluid resins.

1. Copaiva.
2. Terebinthina vulgaris.
3. Terebinthina Veneta.
4. Balsamum Meccæ.
5. Balsamum Canadense.
6. Pistachi.

Addition.

7. Pix liquida.

Order 2. Resinous Juices, with benzoic acid.

6. Balsamum Peruvianum.
7. Balsamum Tolutanum.
8. Storax liquida.

Class xx. Volatile Oils.

Order 1. Substances with an odorous principle analogous to volatile oil.

1. Flores violarum.
2. Convollariæ majalis flores.
3. Flores tiliæ.
4. Flores verbasci.
5. Flores sambuci.
6. Flores pruni spinosæ.

Order 2. Containing a true volatile oil.

A. Camphoraceous oils.

7. Oleum cajeputi.
8. Cardamomum minus.
9. Cubebæ.
10. Calami aromatici radix.
11. Zedoariæ radix.
12. Zingiberis radix.
13. Galangæ radix.
14. Rorismarini herba et flores.
15. Salviæ herba.
16. Hysopi herba.
17. Menthæ piperitæ herba.
18. Menthæ crispæ herba.
19. Lavandulæ flores.
20. Majoranæ herba.
21. Origani vulgaris herba.
22. Mari Syriaci herba.
23. Serpentariæ Virginianæ radix.
24. Valerianæ radix.

Cinnamon flavour

25. Cassiæ cortex.
26. Cinnamomi cortex.
27. Cassiæ flores.

Clove flavour.

28. Caryophilli aromatici.
29. Canellæ albæ cortex.
30. Winteræ aromaticæ cortex.
31. Pimento.

Nutmeg flavour.

32. Nux moschata.
33. Macis.

Anise flavour.

34. Anisi vulgaris semina.
35. Anisi stillati semina.
36. Fœniculi semina.
37. Fœniculi radix.
38. Angelicæ radix.
39. Sassafras.

Vanille flavour.

40. Vanillæ siliqua.
41. Cascarillæ cortex.

Lemon flavour.

42. Citri cortices.
43. Aurantiorum Curassaviensium cortices.
44. Melissæ herba.
45. Serpylli herba.

Rose flavour.

46. Flores rosarum pallidarum.
47. Lignum Rhodii.

Violet flavour.

48. Iridis florentina radix.

Saffron flavour.

49. Crocus.

Caraway flavour.

50. Carui semina.
51. Cumini semina.
52. Nigellæ sativæ semina.
53. Phellandrii aquatici semina.
54. Petroselini semina.

Turpentine flavour.

55. Oleum terebinthinæ.
56. Sabinæ folia.
57. Juniperi baccæ.

Chamomile flavour.

58. Chamomillæ vulgaris flores.
59. Millefolii flores et herba.

Tansy flavour.

60. Tanaceti herba, flores et semina.
61. Absinthium vulgare.
62. Ruta vulgaris.
63. Semen santonici.

Pungent from sulphuretted hydrogen.

64. Allii radix.
65. Cepæ radix.
66. Cochleariæ armoraciæ radix.
67. Cochleariæ herba.

Ratafia flavour.

See Narcotics.

Elecampane flavour.

68. Inulæ helenii radix.

Strong smelling animal substances.

69. Castoreum.
70. Moschus.
71. Ambra grisea.

Class xxi. Camphor.

1. Camphora ex lauro.
2. Camphora ex oleis volatilibus.

Class xxii. Anemonin.

1. Pulsatillæ nigricantis herba.

Class xxiii. Narcotic Principle.

Order 1. Without evident acrimony.

Section 1. Depending upon an alkaline principle.

1. Opium.

Section 2. Depending upon narcotic extractive.

2. Conium maculatum.
3. Hyosciamus niger.
4. Datura stramonium.
5. Atropa belladonna.
6. Lactuca virosa, sativa.
7. Dulcamaræ stipites.

Order 2. With evident acrimony.

8. Nicotiana tabacum.
9. Digitalis purpurea.
10. Aconitum napellus.
11. Cicuta aquaticus.
12. Chædrophyllum sylvestre.
13. Rhododendron chrysanthum.
14. Ledum palustre.

Class xxiv. Containing prussic acid.

1. Pruni laurocerasi folia.
2. Amygdalæ amaræ.
3. Persicæ flores, folia et nuclei

4. Cerasorum nuclei.
5. Acaciarum flores.
6. Pruni padi cortex.

Class xxv. Containing an acrid principle, not volatile oil.

1. Colchici radix.
2. Scillæ radix.
3. Ari radix.
4. Flammulæ Jovis herba.
5. Clematidis vitalbæ herba.
6. Chelidonii minoris radices.
7. Rhois toxicodendri folia.

Pharmaceutical Calendar for the Climate of Weimar, by Göttling, shewing the principal Objects which the Apothecary has to attend to in each month of the year.

JANUARY.—The concentration of vinegar by freezing.
Muriate of antimony,
Ethers, dulcified spirits,
Dippel's animal oil to be prepared;
Some gum-resins, as assafœtida, galbanum, ammoniac, &c. to be powdered.

FEBRUARY.—As in January.

MARCH.—Mezereon bark,
Misleto of the oak to be gathered;
Conserve of scurvy-grass to be prepared.

APRIL.—Spirit of scurvy-grass,
Syrup of violets to be prepared.

MAY.—Sloe flower water,
Conserve of sorrel;
Plaster of henbane,
Extracts of succory, henbane, grass, dandelion, &c.
Oil of beetles, (Meloë majalis et proscarabæus,)
Spirit of ants, earthworms, &c.

JUNE.—Distilled water of lily of the valley,
Various distilled spirituous waters,
Conserves of various herbs and flowers, as conserve of roses, &c.
Hemlock plaster,
Extracts of hemlock, fumatory, wild lettuce, aconite, &c.

JULY.—Vinegar of roses,
Rose water,
Marjoram butter,
Preserved cherries, walnuts, currants, &c.
Extract of elaterium,
Honey of roses,
Boiled oil of Hypericum,

Distilled oil of rosemary, mint, parsley, pennyroyal, wild thyme, &c.
Syrup of cherries, raspberries,
Spirit of rosemary.

AUGUST.—Cherry water.
Extract of blessed thistle, thorn apple, &c.
Boiled oil of wormwood, chamomile, &c.
Distilled oil of wormwood, chamomile, peppermint, millefoil, rue, &c.
Rob and syrup of mulberries.

SEPTEMBER.—Quince cinnamon water,
Oxymel of meadow saffron,
Quince cakes,
Syrup of barberries, quince, buckthorn,
Tincture of steel, with quince juice.

OCTOBER.—Tincture of steel, with apple juice.

NOVEMBER and DECEMBER.—As in January.

Pharmacopœias published by authority in the principal States of Europe and America, with the titles of some of the earliest.

BRITISH EMPIRE.

Pharmacopœia Collegii Regalis Medicorum Londinensis. Lond. 8vo, 1824, pp. 205.

Pharmacopœia Collegii Regii Medicorum Edinburgensis. Edin. 8vo, 1817, pp. 263.

Pharmacopœia Collegii Regii Medicorum Regis et Reginæ in Hibernia. Dublinii, 8vo, 1807, pp. 297.

FRANCE.

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Formulaire Pharmaceutique à l'Usage des Hospices Militaires. Paris, an. xiii.

Code Pharmaceutique à l'Usage des Hospices Civiles, &c. par ordre du Ministre du l'Interieur, par A. Parmentier. Paris, an. viii.

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Pharmacop. Rossica, rec. opus plane novum. Petrop. 1803, 4to.

Pharmacop. Navalis Rossica, ed. ab And. Bacheracht. Petrop. 8vo. 1784.

Pharmacop. Castrens. Ruthena, auct. Jac. Wylie, Equit. Petrop. editio tertia, gr. 8vo, 1818, pp. xxxii. & 316.

Pharmacopœia regni Poloniæ. Varsoviæ, 8vo maj. 1817.

Pharmacopœia Fennica. Aboæ, 8vo maj. 1819.

DENMARK.

Pharm. Danica, Regia auctoritate, a Collegio Sanitatis Regio Medico-Chirurgico Haffniensi conscripta. Hanf. 1805, 4to, pp. 184, cum Indicibus.

SWEDEN.

Pharmacopæia Suecica. Holm. 1817, 4to maj. pp. xviii. & 166.
Pharmacop. Militaris, Navalis, et eorum usui accommodata qui impensis publicis curantur. Holm. 8vo, 1789.

BATAVIA.

Pharmacopœia Batava, recusa cum notis et additamentis Medico-Pharmaceuticis, &c. edid. Jo. Frid. Niemann. Lips. 2 tom. 8vo maj. 1811.

GERMANY.

Pharmacopœia Bavarica, jussu Regio. Edita 8vo, Monachii, 1822, pp. xvi. & 332.
Pharmacopœia Borussica, (auct. L. Formey et M. H. Klaproth.) Berol. 1821.
Pharmacopœia Castrensis Borussica, edit. nova, auct. Görcke et Hermbstädt, Berol. 1805.
Pharmacopœia Austriaca. Editio 3tia emendata. Vindob. 1820, 8vo maj. pp. 166.
Pharmacopœia Austriaco-Provincialis. Vien. 1794, 8vo, pp. viii. & 195.
Pharmacop. Austriaco-Castrensis. Vindob. 8vo, 1795.
Pharmacopœia Saxonica, jussu Regio et auctoritate publica edita. Dresdæ, 8vo maj. 1820, pp. 428.
Pharmacopœia Hannoverana. 8vo maj. Hannoveræ, 1819, pp. xvi. & 396.
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Pharmacop. Palatina. Manheim, 4to. 1803.
Dispensatorium Hassiacum, cur. Piderit. Casell, 1806. Additamenta, 1816.
Pharmacopœia Pauperum in usum Instituti Clinici Hamburgensis. Hamburg. 8vo, 1804.
Pharmacop. Oldenburgica, cum gratia et privilegio, (auct. Gramberg.) Oldenburgi, 8vo, 1801, pp. 250.
Pharmacop. in usum officinarum Reipublicæ Bremensis. 1792.
Dispensatorium Lippiacum, genio moderno accommodatum, auctoritate Collegii Medici redigit Jo. Ch. Fr. Scherf. Lemgo, vol. i. 1792; vol. ii. 1794.
Dispensatorium Fuldense, à F. A. Schlereth. edit. ii. Francof. 1791.
Dispensatorium Pharmaceuticum Ratisbonense. Fol. 1727.
Pharmacop. Argentoratensis. Fol. 1757.
Dispensatorium Pharmacoporum omnium, auct. Val. Cordo, nunc vero opera et studio Medici Reipublicæ Norimbergensis publ. Norimb. 1592, fol.
Pharmacopœia Augustana. Aug. Vindel. 1764.
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SWISSERLAND.

Pharmacop. Genevensis, auct. C. G. Dunant, L. Odier et De la Roche. Gen. 8vo, 1780.
Manuale Pharmaceuticum in usum minorum urbium. Basil, 8vo, 1779.
Pharmacop. Helvetica. 1771, fol.

ITALY.

Pharmacopea Ferrarese, del dott. Antonio Campana. Firenz. edit. 7ma, 1821, pp. 423.

Formulario Farmaceutico. Genova, 1791, 8vo.

Formulario Farmaceutico per uso dell Ospedale di Pammatone. Genov. 8vo. 1798.

Codice Pharmaceutico per lo stato della ser. Rep. di Venezia, compilato per ordine del eccellentiss. magistrato della sanita. Padov. 4to maj. 1790.

Ricettario Fiorentino, nuovamente compilato e redotto all' uso moderno, diviso in due parte. Firenze, 1789, 4to, pp. 350.

Bononiensis Collegii Medicorum Antidotarium, editum anno 1783. Editio novissima, in qua locupletissimus adjectus est Index Virium ac Usuum Medicamentorum. Venet. 4to, 1783.

Pharmacop. Sardoa, ex selectioribus codicibus, optimisque scriptoribus collecta, in unum corpus digesta, ac nunc primum edita, a Jac. Jn. Pedemontano August. Taurin. 4to. 1773.

Pharmacop. Messenensis. Mess. fol. 1629.

Antidotario Romano commentato de Pet. Castello. Rom. 4to, 1629.

Pharmacopœia Bergamensis, rationem componendi medicamenta usitatoria complectens, ed. P. Lanci et P. Maselli. Berg. 4to, 1580.

Ricettario de dottori del Arte e di Medicina dell Collegio Fiorentino all' instanza de Signori Consuli della Universita cett. Fiorenze, fol. 1498. Recus. ibid. 1567, 1597.

SPAIN.

Pharmacop. Madritensis, protomedicatus auctoritate elaborata. 4to, 1739.

Pharmacop. Catalana. 4to, 1686.

Pharmacop. Valentiniansis. Valenc. 4to, 1651.

Pharmacop. Hispana. Editio altera, Regis jussu et impensis. Madrit. 8vo, 1798.

PORTUGAL.

Pharmacopeia Geral para o Reina e Dominios de Portugal, publicada por ordem da Rainha Fidelissima Maria I. 8vo, Lisbon, 1794, tomo i. Elementos do Pharmacies, pp. 228 ; tomo ii. Medicamentos simplices, preparando se compositos, pp. 248.

AMERICA.

The Pharmacopœia of the United States of America, 1820. By the authority of the Medical Societies and Colleges. 8vo, Boston, Dec. 1820, pp. 272.

The Pharmacopœia of the Massachusett's Medical Society. Boston, 8vo, 1808, pp. 272.

Mr Frederick Fleischer, bookseller in Leipsic, is publishing a Collection of the Pharmacopœias of the different states of Europe, under the title of CODEX MEDICAMENTARIUS EUROPÆUS. Of this work, seven sections have appeared, and some have been reprinted.

Sectio prima.—Codex Medicamentarius Britanniæ, 3 vols.
  Vol. i. Pharmacopœia Londinensis, editio nova, 1821, pp. 128.
  Vol. ii. Pharmacopœia Edinburgensis, editio nova, 1822, pp. 152.
  Vol. iii. Pharmacopœia Dublinensis, 1818, pp. 148.

Sectio secunda.—Pharmacopœia Gallica, 1819, pp. ccxx. & 419.

Sectio tertia.—2 vols.
Vol. i. Pharmacopœia Suecica, 1821, pp. 224.
Vol. ii. Pharmacopœia Danica, 1821, pp. 228.

Sectio quarta.—Pharmacopœia Batava, 2 vols. Editio 2da, emendata et aucta, 1824.
Vol. i. Pharmacopœias continens, cum Notis, pp. 728.
Vol. ii. Additamenta et Indicem, pp. 805.

Sectio quinta.—2 vols. 1821.
Vol. i. Pharmacopœia Rossica et Fennica, pp. 376.
Vol. ii. Pharmacopœia Regni Poloniæ, pp. 199.

Sectio sexta.—2 vols. 1822.
Vol. i. Pharmacopœia Hispanica.
Vol. ii. Pharmacopœia Lusitanica.

Sectio septima.—1 vol. Litteratura Pharmacopœarum collecta à Doctore Alex. Nicol. A. Scherer, Societatis Pharmaceuticæ Petropoli Florentis Directore, &c. &c. 1822, pp. 132.

To complete the work, the Pharmacopœias of Germany and Italy are wanting. These are, however, so numerous, that the republication of the whole would be improper. The publisher therefore proposes to condense them into two sections, that for Germany having as its basis a new edition of the Prussian Pharmacopœia, which is in preparation; and the work will be concluded by an Introduction and Conspectus of the whole by Dr Scherer.

PART II.

MATERIA MEDICA.

Every substance employed in the cure of disease, whether in its natural state, or after having undergone various preparations, belongs to the Materia Medica, in the extended acceptation of the words. But in most Pharmacopœias, the materia medica is confined to simples, and to those preparations which are seldom prepared by the apothecary himself, but commonly purchased by him, as articles of commerce, from druggists and others.

Systematic authors on this branch of medical knowledge have bestowed much pains in contriving scientific arrangements of these articles. Some have classed them according to their natural resemblances; others according to their active constituent principles; and others according to their real or supposed virtues. Each of these arrangements has its particular advantages. The first will probably be preferred by the natural historian, the second by the chemist, and the last by the physiologist. But every scientific classification hitherto proposed is liable to numerous objections. Accordingly, in the Pharmacopœias published by the Colleges of Physicians of London, Dublin, and Edinburgh, the articles of the materia medica are arranged in alphabetical order; and the same plan is now almost universally adopted. I have therefore also followed it, subjoining to the name of each article, admitted by any of the British colleges, a short view of its natural, medical, and pharmaceutical history; and in thus forming a Dictionary of Materia Medica, I have generally adopted the nomenclature of the Edinburgh College.

ABIETIS RESINA. *Lond.* See PINUS ABIES.

ABROTANUM. *Dub.* See ARTEMISIA.

ABSINTHIUM MARITIMUM. *Dub.* ABSINTHIUM VULGARE. *Lond. & Dub.* See ARTEMISIA.

ACACIA. Willd. *Lond. Ed.*
MIMOSA. Linn. Persoon. *Dub.*

Polygamia Monœcia, Linnæi Species Plantarum, edit. Willdenow, *g.* 1902.—*Monadelphia Polyandria, g.* 1655, Persoon.—Nat. ord. *Lomentaceæ* Linn.; *Leguminosæ,* Sect. *Mimosæ,* Jussieu *.

Sp. 87. ACACIA VERA. Willd. *Lond. Ed.*
MIMOSA NILOTICA. Linn. Pers. *Dub.*

Sp. 86. ACACIA ARABICA. *Ed.*
Gum Mimosa.

Officinal—The gum. Gum-Arabic.
ACACIÆ ARABICÆ GUMMI. *Ed.*
GUMMI ACACIÆ. *Lond.*
GUMMI ARABICUM. *Dub.*

GUM ARABIC is a concrete juice, which exudes from various trees of moderate size, natives of the sandy deserts of Africa, Arabia, and other parts of Asia. The genus to which they belong has been named Mimosa, Acacia, and again Mimosa by Persoon; nor are authors agreed about the species from which the several varieties of gum are obtained. But, it is believed, that the greatest quantity is furnished by those named by the Colleges. From these it exudes either spontaneously, or from incisions made into the bark, and afterwards hardens in the air. But a similar gum may be obtained from other species of Acacia, and from many other trees, such as the Swietenia febrifuga, Melia azadirachta, and different species of Terminalia. It is remarkable, that the barks of all the trees which furnish this bland mucilaginous substance are highly astringent; that of the Acacia itself is used in India for tanning; and in our country, the cherry and plumb trees, which sometimes yield gum, have very astringent barks.

There are two kinds of gum found in the shops of this country, and often sold promiscuously, but distinguished in commerce by the names of Gum Arabic, and East-India gum. Gum Arabic consists of roundish transparent tears, colourless, or of a yellowish colour, shining fracture, without smell or taste, and almost perfectly soluble in water. The pieces which are most transparent, and have least colour, are reckoned the best. They are sometimes selected from the Gum Arabic in sorts, and sold for about double the price, under the title of Picked gum. The East-India gum is darker coloured than Gum Arabic, and is not so readily soluble in water. I have had gum from New South Wales, darker coloured even than East-India gum, and less soluble. It is remarkable, that the coarsest gum forms the thickest mucilage; at least Botany-Bay gum forms a thicker mucilage than East-India gum, and this than Gum Arabic.

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* See Botanique Medicale; ou Histoire Naturelle et Medicale des Medicamens, du Poisons, et des Alimens, tirés du regne vegetale; par Achille Richard, 2 tom. 8vo. Paris, 1823.

In the Parisian Pharmacopœia there are two varieties of Gum Arabic admitted; *Gummi Thuræi*, which, by comparison, I find to correspond with our picked, and *Gummi Jaddæ* with our common gum. Their *Gummi Senegalense* resembles our East-India Gum.

Gum Arabic was originally brought from Arabia, by the way of Egypt, to Marseilles; and it was not until the beginning of the seventeenth century that the Dutch made the gum of Senegal known in Europe. After the French got possession of that river, they directed their attention to it, as an important object of commerce, and ascertained, by experiments made in the latter half of the seventeenth century, that gum Senegal was superior to the best gum of Arabia; and for about fifty years it has had the preference.

M. Adanson examined all the gum trees of West Africa with great care, and has given the best description of them. They amount to forty in number; but the three great forests which supply the Senegal market consist chiefly of two kinds; one which produces a white gum, called *Vereck*, and another, called *Nebueb*, which yields a red gum.

About the middle of November, that is, after the rainy season, which begins early in July, a gummy juice exudes spontaneously from the trunk and principal branches. In about fifteen days, it thickens in the furrow, down which it runs, either in a vermicular shape, or more commonly assuming the form of round or oval tears, about the size of a pigeon's egg, of different colours, as they belong to the white or red gum-tree. About the middle of December, the Moors encamp on the borders of the forest, and the harvest lasts six weeks. The gum is packed in very large sacks of tanned leather, and brought on camels and bullocks to certain ports, where it is sold to the French and English merchants.

About 1787, the annual quantity purchased by the former was about 800,000 pounds, and by the latter 400,000, according to the information of M. Golberry.

Mr Jackson, in his account of the Empire of Morocco, informs us, that from Mogodor they export two sorts of gum, one the common Gum Arabic, the produce of Morocco, and called Barbary Gum; the other finer, called Gum Soudan, or Senegal, brought from Timbuctoo by the caravans. He also says, that the gum called Morocco or Barbary Gum is produced from a thorny tree called *Atalleh*, having leaves similar to the juniper. It yields most gum during the hot and parching heat of July and August; and the hotter the weather, and the more sickly the tree appears, the more gum it yields. A wet winter and a mild summer are unfavourable to gum.

Gum is highly nutritious. During the whole time of the gum harvest, of the journey, and of the fair, the Moors of the desert live almost entirely upon it; and experience has proved that six ounces are sufficient for the support of an adult during twenty-four hours.

The characters generally given of gum as a vegetable principle belong only to fine gum Arabic, which is transparent and colourless, easily reduced to powder, without smell, and of a slightly sweetish taste. The solution of gum in water constitutes mucilage; it is thick and adhesive, and soon dries when exposed to the air. Gum is also soluble in the weak acids; but is totally insoluble in alcohol, which even precipitates it from mucilage. When triturated with a small quantity of oil or resin, it renders them miscible with water. Gum is very little disposed to spontaneous decomposition; even mucilage may be kept for many years without change, except a tendency to yield acetous acid, on increase of temperature; but gum is decomposed by the strong acids. By oxygenizement with nitric acid, it forms successively mucic, malic and oxalic acid; with oxymuriatic acid it forms citric acid. When exposed to heat, it does not melt, but softens, swells, and becomes charred and incinerated. Its products are carbonic acid, and carburetted hydrogen gas, empyreumatic oil, and a considerable quantity of acetic acid, combined with a little ammonia.

Medical use.—It possesses the powers of a mucilaginous demulcent in a high degree. It is useful, 1. In all cases where there seems a natural deficiency of mucus in the ir
testinal canal, and was therefore recommended by Degne
Pringle and others, dissolved in milk, barley water, or a

mond emulsion, to remove the tenesmus and painful stools. Zimmerman gave it in clyster for the same purpose.

2. In cases of acrid poisons, or acrid substances in general, taken into the stomach, to envelop their particles, and mitigate their action. With the same view it is sometimes given along with acrid medicines.

3. In an irritable state of the respiratory passages, as catarrh, hoarseness, and cough. For this purpose it may be either used in substance as a troche, or in a strong solution as a linctus, and may be combined with a little opium.

4. In gonorrhœa and ardor urinæ, probably upon a false analogy.

5. In salivation after mercury, or in small pox.

6. In phthisis pulmonalis, both as supposed to check hæmorrhagy, and as a light nourishment.

Externally it is applied,

1. In powder, to bleeding vessels of a small size, as a styptic, operating by gluing them up.

2. In solution, injected into the urethra, in gonorrhœa.

A scruple or upwards may be given three or four times a day in substance, powder or solution, and it may be combined with syrups, infusions and decoctions in general, but it is decomposed by alcohol, and acetate of lead.

Sp. 73. ACACIA CATECHU. Willd. *Lond. Ed.*
MIMOSA CATECHU. Linn. Pers. *Dub.*
Off.—Catechu. The extract of the wood.
ACACIÆ CATECHU EXTRACTUM *ex ligno. Ed.*
CATECHU EXTRACTUM. *Lond.*
CATECHU. *Dub.*

THIS tree is a native of Hindostan. In Bengal, the extract of catechu, which was formerly termed, with peculiar impropriety, Japan Earth, is principally prepared from the internal coloured part of the wood, by decoction, evaporation, and exsiccation in the sun. But catechu is also prepared in India from other species of Acacia, and even from the woods, barks, and fruits of other genera, as the Nauclea Gambir; and many varieties of catechu have been sent to me from different parts of India. In Mysore, it is chiefly prepared from the nuts of the Areca catechu.

Catechu has the appearance of a dried extract of various forms, rounded masses, or cut into squares or lozenges. It is perfectly opaque, and has always an earthy fracture.

The Bombay catechu is of an uniform texture, and of a red-brown tint, its specific gravity being generally about

1.39. The extract from Bengal is more friable and less consistent. Its colour is like that of chocolate externally; but when broken its fracture presents streaks of chocolate and of red-brown. Its specific gravity is about 1.28. Their tastes are precisely similar, being astringent, but leaving in the mouth a sensation of sweetness. They do not deliquesce, or apparently change by exposure to the air, and are not fusible.

In the first edition of this Dispensatory, in 1803, I published, as the results of my analysis of catechu, that it consisted chiefly of tannin and extractive. This has been confirmed by the subsequent examination by Sir H. Davy, who states that it contains about one half of its weight of tannin, 35. *per cent.* of extractive, 6 to 8 of mucilage, and 5 to 7 of impurities.

Chemists have not yet succeeded in presenting the astringent principle in a state of purity. It appears, too, that it exists in the state of a supergallate of tannin; but tannin differs from the other compound alkalies, in being much more soluble in water. The properties ascribed to these principles by chemists are the following:

Tannin, when completely dried, is a brittle substance, of a black colour, and vitreous fracture; it is soluble in alcohol; it is much more soluble in hot than in cold water. The solution has a dark brown colour, astringent taste, and peculiar smell; it is precipitated by acids, in the form of a viscid fluid, like pitch; it is also precipitated by carbonate of potass in yellow flakes; it forms an insoluble elastic precipitate with gelatin, and green, dark blue or black precipitates with iron. Mr Hatchett has prepared a species of tannin artificially by the action of nitrous acid upon charcoal, indigo, or resins, or with sulphuric acid upon resins or camphor. Its colour, taste, and chemical properties generally resemble those of tannin; but it is very doubtful, from Chevreul's experiments, that it is not a mere compound of charcoal and nitric acid.

Gallic acid crystallizes in brilliant colourless plates, of an acid and somewhat austere taste, and of a peculiar odour when heated. It may be sublimed, but slightly altered, by a gentle heat. It is not altered by exposure to the air, is soluble in 1½ of water at 212°, and in 12 waters at 60, and in four times its weight of alcohol. It has a strong affinity for metallic oxides, especially those of iron. It precipitates gold, copper, and silver-brown, mercury orange, iron black, bismuth yellow, and lead white.

Medical use.—Catechu is one of the most convenient and powerful astringents we possess, and may be exhibited in every case where astringents are indicated. It is particularly serviceable in diarrhœa, in hoarseness from relaxation of the fauces, ulcers and aphthæ in the mouth, and in excoriations, with lymphatic exudations.

ACETUM; scientific synonime, ACIDUM ACETICUM IMPURUM. *Lond. Ed.*

ACETUM VINI. *Dub.*

VINEGAR. Impure acetic acid.

VINEGAR, as obtained by the fermentation of vinous liquors, besides the pure acetic acid diluted with much water, contains tartaric acid, tartrate of potass, mucilaginous and saccharine matters, a peculiar spiritous liquor described by Mr Chenevix, and sometimes malic and phosphoric acids. Mr Chenevix found that English vinegar of specific gravity 1.0042 contained more water and mucilage, but less acid and spiritous liquor than French vinegar of 1.00721. The best vinegar is that prepared from white wine. Vinegar should be of a pale yellow colour, perfectly transparent, of a pleasant, somewhat pungent, acid state, but without any acrimony.

From the mucilaginous impurities which vinegar always contains, it is apt, on exposure to the air, to become turbid and ropy, and at last vapid. This inconvenience is best obviated by keeping it in bottles completely filled and well corked; and it is of advantage to boil it in the bottles a few minutes before they are corked.

Vinegar is sometimes adulterated with sulphuric acid. Its presence is detected, if, on the addition of a solution of nitrate of baryta, a white precipitate is formed, which is insoluble in nitric acid. With the same intention, of making the vinegar appear stronger, different acrid vegetables are occasionally infused in it. This fraud is difficult of detection, except by ascertaining their power of neutralizing alkalies; but when tasted with attention, the pungency of such vinegar will be found to depend rather on acrimony than acidity.

ACIDUM ACETICUM FORTIUS. *Lond.*

" Stronger acetic acid distilled from wood. Its specific gravity is to that of water as 1.046 to 1000, and 100 grains of this acid should neutralize 87 of crystallized subcarbonate of soda."

One of the products of the destructive distillation of wood is acetic acid, at first very impure, from the empyreumatic oil with which it is largely contaminated. Copse oak, after being barked, is much employed. It is decomposed in iron cylinders, and the acid liquor is in the first place deprived of a great part of the oil or tar by distillation. It is still, however, very impure. The next step in the process is to neutralize it with lime, and evaporate to dryness, so as to form an impure acetate of lime, from which a very strong acetic acid is obtained by adding sulphuric acid, and subjecting the mixture to distillation; the acetic acid passes over, and dry sulphate of lime is the residuum. The acetate of lime is sometimes first decomposed by sulphate of soda, when the products are sulphate of lime and acetate of soda. The latter is then decomposed by sulphuric acid, and the residuum in this case is sulphate of soda.

The acid thus obtained is called pyrolignic acid, although freed from empyreumatic oil; or oak vinegar. For culinary purposes it is very inferior to white wine vinegar, as it is totally destitute of fine aroma, and in its purest state is merely sour. For the chemical arts it is however superior, as it is totally free of all mucilage and decomposable matter; and it has the advantage of being easily got of the strength directed by the Pharmacopœia, which is six times as strong as common or distilled vinegar. Mr Phillips says he has not met with it of a greater strength than 1.043; but Messrs Turnbull and Ramsay of Glasgow furnish it abundantly of a strength which remains crystallized at 50° Fahr. When fluid at 60°, the specific gravity of this acid is 1.06296, and Dr Thomson considers it in this state to consist of one atom of real acid and one atom of water, as 7.375 grains of these crystals just neutralize 8.75 anhydrous carbonate of potass.

Mr Phillips says that the strongest malt vinegar is termed *Proof Vinegar*, and by the manufacturer called No. 24. It is estimated to contain 5 *per cent.* real acid, and the maker is allowed to mix $\frac{1}{1000}$ of its weight of sulphuric acid with it. 1000 parts of such vinegar should saturate 148 of crystallized subcarbonate of soda, and ought not to yield more than 2.5 grains of sulphate of barytes.

Vinegar possesses strong antiseptic powers on dead animal and vegetable matters. Hence its employment in pickling. The fine green colour, so much admired in some vegetable pickles, is often improperly given by means of copper. This poisonous addition is easily detected, by the fine blue colour produced, on dropping some carbonate of ammonia into the suspected vinegar. The peculiar property of pyrolignic acid to preserve animal substances depends upon the empyreumatic oil, and was known to the Egyptians, who actually employed it in the preparation of their mummies.

Medical uses.—Its action on the living body is gently stimulant and astringent. It promotes transpiration and the discharge by urine; and used moderately as a condiment, it facilitates digestion.

Vinegar is employed as a useful addition to drink in inflammatory fevers, in the proportion of about an ounce to a quart. Internally, it is used in ardent fevers and putrid diseases, in plague, in scurvy, and to counteract the effects of narcotic poisons and mephitic vapours. Faintings, hysterical and hypochondriacal complaints, and vomiting, are frequently relieved by vinegar taken into the stomach, or applied to the lips and nostrils. In the form of clyster, it is used in the same diseases, and in obstinate constipation. Externally, it is applied in fomentations and baths, as a stimulant and discutient; and its vapour is inhaled in putrid sore throat, and diffused through the chambers of the sick, to correct the putrescency of the atmosphere.

ACIDUM CITRICUM. *Lond.*
ACIDUM CITRICUM CRYSTALLIZATUM. *Ed.*
ACIDUM CITRICUM CRYSTALLIS CONCRETUM. *Dub.*

Citric acid in crystals.

THE simple expressed juice of lemons is extremely apt to spoil, on account of the sugar, extractive, mucilage and water, which cause it to ferment.

Various means have been proposed and practised, with the intention of rendering it less perishable and less bulky. The juice has been evaporated to the consistence of a rob; but this always gives an empyreumatic taste, and does not separate the extractive or mucilage, so that it is still apt to ferment when agitated on board of ship in tropical climates. It has been exposed to frost, and part of the water removed under the form of ice; but this is liable to all the former objections, and, besides, where lemons grow, there is not a sufficient degree of cold. The addition of a quantity of alcohol to the inspissated juice separates the mucilage, but not the extractive or sugar. Scheele first pointed out the method of obtaining citric acid perfectly pure and crystallized; and in the former edition of the London Pharmacopœia, the process was inserted among the preparations, although rejected from the present, as the salt is never prepared by the apothecary, but purchased by him as an article of commerce. The directions given were,—

Take of
  Lemon juice, one pint;
  Prepared chalk, one ounce, or as much as may be required to neutralize the acid;
  Diluted sulphuric acid, nine fluidounces.

To the lemon juice, heated to ebullition, gradually add the chalk, and mix them. Then decant the liquor, and wash the citrate of lime, which remains behind, repeatedly with water. Dry it, and then pour upon the dried powder the diluted sulphuric acid; boil for ten minutes, strain it through a cloth with strong expression, and filter through paper. Evaporate the filtered liquor with a gentle heat, until it form crystals on cooling.

In order to render the crystals pure, they must be dissolved twice, or oftener, in water, the solution filtered each time, evaporated and crystallized.

In this process the citric acid of the lemon juice first unites with the lime, and forms a nearly insoluble citrate of lime. This is next decomposed by the sulphuric acid, which forms an insoluble sulphate of lime, and the citric acid is set at liberty, dissolved in the water furnished by the dilute sulphuric acid, from which it is readily obtained by crystallization.

The citrate of lime is sometimes prepared in the countries where the lemons grow; and Mr Parkes, Tilloch's Journal, vol. xlvi. p. 60, on the authority of a manufacturer in Sicily, has given some curious details on the subject. 74.964 gallons of lemon juice were used, which, with 35.017 pounds of chalk, gave 49.902 pounds avoirdupois of citrate. The quantity of citrate produced by every pound of chalk varied from 19 to 27 ounces, and from every gallon of juice from 8¼ to 12¾ ounces. This disparity arose from inequality in the acidity of the juice, and from the same quantity of chalk being used with every kind of juice. The chief difficulty of the manufacture consisted in drying the citrate.

The crystals are permanent, and dissolve in three-fourths of their weight of cold, and half their weight of boiling water. The solution in eight waters is said to be equal in strength to lemon juice.

Med. use.—In some respects this concrete acid is superior, and in others greatly inferior to lemon juice. It has not the flavour, and, what is of more consequence, it has not the freshness or antiscorbutic powers of the fruit; but from its solid form and gradual solution it is convenient, and is excellently adapted for effervescing mixtures. Dr Haygarth found that 26 parts of the crystallized acid saturate 61 of subcarbonate of potash, 42 subcarbonate of ammonia, and 40 of carbonate of magnesia.

ACIDUM SULPHURICUM. *Lond. Dub. Ed.*

Sulphuric acid, Vitriolic acid.

THE London College directs, that its specific gravity should be to that of water as 1850 to 1000; the Dublin and Edinburgh Colleges as 1845 to 1000.

It is inserted among the materia medica, because it is never prepared by the apothecary, but purchased from wholesale manufacturers. It is obtained in two ways; the first, by distilling off the acid from sulphate of iron, previously deprived of its water of crystallization by heat. In this way the strongest acid is obtained at once, but it is apt to contain iron or copper, besides sulphurous acid. The second process is by burning sulphur, and transmitting its fumes into immense leaden chambers, of which the bottom is covered with water. Along with the sulphurous acid gas, it is necessary that a proportion of nitrous acid gas should be mixed. These two acid gases by their union form minute crystals, which are decomposed the moment they fall into the water. The sulphurous acid is converted into sulphuric by abstracting a proportion of oxygen from the nitrous, which immediately ascends in the form of nitric oxide, and uniting with the oxygen of the air of the chamber, is again converted into nitrous acid, which combines with more sulphurous acid, and thus the same quantity of nitrous acid oxygenates successively many doses of sulphurous acid, until the air of the chamber be deprived of its oxygen. The dilute sulphuric acid thus obtained is then concentrated by evaporation, first in leaden troughs, and then in glass boilers. Got in this way it generally contains lead, which is easily detected by mixing a portion of the acid with three parts of distilled water; and if the acid be impure, a deposition will be formed. It may be rendered perfectly pure by distillation from a green glass or platinum retort, gradually heated in a sand-bath, as long as any acid comes over. The receiver should not be luted on.

All the sulphuric acid used in Britain is prepared in the latter mode, and is known on the Continent by the name of English sulphuric acid, to distinguish it from the fuming acid of Nordhausen. It is a great error in the London College to direct that the acid should have the sp. gr. of 1.850, as Dr Ure found that it could not be prepared stronger than 1.8455, and that the sp. gr. of commercial acid should not exceed 1.8485, which already contains from $\frac{5}{1000}$ to $\frac{7.5}{1000}$ of foreign saline matter, chiefly sulphate of potash and of lead, but that of the shops often contains 3 to 4 *per cent.*, above which it should be considered as sophisticated.

The common state of sulphuric acid is that of a dense liquid containing water; specific gravity 1.847; slightly viscid; transparent and colourless; without smell; of a strong acid taste. It freezes at —36°, and boils somewhat above 600°. It has a strong attraction for water, absorbing it rapidly from the atmosphere, and producing considerable heat when mixed with it. It is decomposed by most inflammable substances yielding sulphuric acid, and getting blackened from their charcoal. It does not oxidize gold, platinum, tungsten, or titanium. It decomposes the alkaline and earthy sulphurets, and chars organic substances. It consists of 1 atom of anhydrous sulphuric acid and 1 atom of water, or of 50 and 11.25 by weight. M. Bussy has lately succeeded in preparing anhydrous sulphuric acid, which consists of 1 atom of sulphur and 3 of oxygen, or by weight 20 and 30 parts. It is solid, opaque, white; difficultly scissile, or in groups of silky crystals; fuming at ordinary temperatures; strongly attracting humidity from the air; hissing when thrown upon water, generating steam; combining with anhydrous bases, without the evolution of any sulphurous acid; charring vegetable substances instantly. It melts at 77° Fahr., becoming more liquid than sulphuric acid, strongly refracting light; sp. gr. 1.97; dissolving sulphur brown, green or blue; iodine greenish blue; and indigo red.

The glacial sulphuric acid of Nordhausen is a variable mixture of the anhydrous acid, common liquid acid, and sometimes sulphurous acid.

Sulphuric acid acts powerfully on dead animal substances, becoming diluted with water formed by the union of part of their hydrogen and oxygen; another portion of the hydrogen combines with the azote to form ammonia, and the carbon is separated in the state of charcoal. The affinities which regulate this action are so powerful, that it produces the same effects on the living solid, and therefore it acts upon them as a corrosive. But to its employment with this view, its fluidity is an objection, as it cannot be easily managed.

Medical uses.—These will be explained when we treat of the diluted sulphuric acid. The concentrated acid, however, made into an ointment with sixteen times its weight of axunge, has been used in the cure of psora.

ACONITUM.

Willd. *g.* 1062. *Polyandria Trigynia.*—Nat. ord. *Multisiliquæ* of Linn., *Ranunculaceæ* of Jussieu.

Species 9. ACONITUM NEOMONTANUM. *Dub.*

Sp. 8. ACONITUM NAPELLUS. *Lond. Ed.*

Large blue Wolfsbane, Monk's-hood, Aconite.

Officinal.—The leaves.

ACONITI FOLIA. *Lond. Dub.*

ACONITI NAPELLI FOLIA. *Ed.*

BOTANISTS are not agreed about the exact species of aconite which was used by Baron Stoerk; and it is probable that all the species of aconite of the blue-flowered section of this genus, possess nearly similar properties.

It is a perennial plant, found in the Alpine forests of Carinthia, Carniola, and other mountainous countries in Germany, and cultivated in our gardens.

The fresh plant and root are very violent poisons, producing remarkable debility, paralysis of the limbs, convulsive motions of the face, bilious vomiting, and catharsis, vertigo, delirium, asphyxia, death. The fresh leaves have very little smell, but when chewed have an acrid taste, and excite lancinating pains, and swelling of the tongue. By drying, their acrimony is almost entirely destroyed. For medical use, the plant must be gathered before the stem shoots.

I am not aware that aconite has been examined chemically since the discovery of the compound alkalies; but its virtues probably depend upon a substance of that nature, which deserves attention.

Uses and dose.—When properly administered, it acts chiefly on the sensibility, producing at last headach and vertigo, with anorexia, but no increased disposition to sleep, nor any effect on the pulse or secretions.

On many occasions it has been found a very effectual remedy in glandular swellings, venereal nodes, stiff joints, spina ventosa, itch, amaurosis, gouty and rheumatic pains, intermittent fevers, and convulsive disorders.

When the powder of the dried leaves is to be used, we may begin by giving one or two grains, and gradually increase the dose; but it is commonly used in the form of an inspissated juice. As soon as the plant is gathered, the juice is expressed and evaporated, without any previous clarification, to the consistence of an extract. It is to be regretted, that the powers of this medicine vary very much; its action is often very violent, and it is often totally inert. It may therefore be laid down as an universal rule, in the employment of this and of many other similar active medicines, to begin with very small doses, and to increase them gradually to the necessary degree; and whenever we have occasion to begin a new parcel of the medicine, we should again commence with the smallest dose, and proceed with the same caution as at first.

We may begin with giving half a grain of this extract, either formed into a powder with ten grains of white sugar, or made up with any convenient addition into a pill, twice or thrice a-day, and gradually increase the dose; or a tincture of aconite may be prepared, by digesting one part of the dried leaves in six parts of the spirit of wine; the dose of which will be at first five or ten drops, and may be gradually increased to forty. I have lately used it with decided, though not always permanent success, in some cases of sciatica, and its effect in suspending the pain was always accompanied by a tingling sensation in the affected part, sometimes increasing to such a degree, as to render the intermission of the remedy necessary, when the pain would return, but mitigated; and thus, at last, by the repeated exhibition and omission of the aconite, the disease was sometimes finally removed. From the use of from 3 to 5 grains of the extract, taken daily for three or four days, the specific effects were generally produced.

ACORUS CALAMUS. *Ed. Lond. Dub.*

Willd. *g.* 663. *sp.* 1.—Smith. *Flor. Brit. g.* 179. *sp.* 1.—*Hexandria Monogynia.*—Nat. ord. *Piperitæ*, Lin., *Aroideæ* of Jussieu.

Sweet flag.

Officinal—The root.

ACORI CALAMI RADIX. *Ed.*

CALAMI RADIX. *Lond.*

ACORI RADIX. *Dub.*

THIS plant is perennial, and grows plentifully in rivulets and marshy places about Norwich, and other parts of England. It is also indigenous in India. The shops have been usually supplied from the Levant with dried roots, which do not appear to be superior to those of our own growth.

The root is full of joints, crooked, somewhat flatted on the sides, internally of a white colour, and loose spongy texture; its smell is strong; the taste warm, acrid, bitterish, and aromatic; both the smell and taste are improved by exsiccation. It is generally looked upon as a carminative and stomachic medicine, and as such is sometimes made use of in practice. The fresh root candied is said to be employed at Constantinople as a preservative against epidemic diseases. The leaves of this plant have a sweet fragrant smell, more agreeable, though weaker, than that of the roots.

From sixteen ounces of the dried root, Neumann obtained by distillation about two scruples of fragrant volatile oil. It also rose in distillation with water, but not with alcohol. It contains also extractive, gum, resin and starch.

ADEPS OVILLUS. *Ed.*
SEVUM. *Lond. Dub.*
Off.—Mutton suet.

MUTTON-SUET is officinal, for the purpose of giving consistency to some ointments and plasters. It is the stiffest and least fusible of the officinal animal fats.

ADEPS SUILLUS. *Dub. Ed.*
ADEPS. *Lond.*

Off.—Hogs-lard.

HOGS-LARD is a very pure animal fat, of a soft consistence. Animal fats possess many properties in common with the fixed oils, and differ chiefly in their being congealed and opaque at the temperature of the atmosphere. They differ considerably in fluidity, from the semifluid duck's grease to the solid mutton suet. All these fats, as well as the fixed oils, have been lately ascertained by M. Chevreul and Braconnot to consist of two substances, Stearin and Elain, combined in different proportions, and separable from each other by merely compressing the fat in bibulous paper. One part is absorbed by the paper, and makes a greasy stain, while the remaining part becomes hard and friable. *Stearin* is crystallizable, white and brittle, with little smell or taste. It melts at from 109° to 120°, is soluble in hot alcohol, but crystallizes from it on cooling. It is altered by the action of alkalies, and forms with them soap. It is the solid part of suet and fats. *Elain* is the fluid constituent of oil and fat, remaining liquid at 59°, and soluble in cold alcohol, which thus furnishes another means of separating them. It is seldom pure, or free from colour and taste.

Hogs-lard is emollient, and is a convenient article for the formation of ointments, plasters, and liniments. It is also used without addition to discuss tumours by friction.

ÆRUGO. *Lond.* See CUPRI SUBACETAS.

ÆSCULUS HIPPOCASTANUM. *Dub.*

Willd. *g.* 717. *sp.* 1.—*Heptandria Monogynia.*—Nat. ord. *Trihilatæ,* Linn., *Hippocastaneæ,* Juss.

Horse chesnut.

Officinal.—The bark.

ÆSCULI HIPPOCASTANI CORTEX. *Dub.*

THE bark is bitter, and has been proposed as an indigenous substitute for the very expensive and often adulterated Peruvian bark. Successful experiments of its effects, when given internally in intermittent and continued fever, and also when applied externally in gangrene, sufficiently warrant future trials. The bark has been analysed by Pelletier to compare it with cinchona; but it is a mere astringent, and contains no active alkali. In powder, it may be given to the extent of a scruple and a half, or a drachm for a dose. Bucholz prefers a solution of a drachm of the extract in an ounce of cinnamon water, of which sixty drops are to be given every three hours.

AGRIMONIA EUPATORIA. *Dub.*

Willd. *g.* 951, *sp.* 1.—Smith. *Flor. Brit. g.* 224, *sp.* 1.—*Dodecandria Digynia.*—Nat. Ord. *Rosaceæ;* Sect. *Agrimoniæ,* Juss.

Agrimony.

Officinal.—The herb.

AGRIMONIÆ HERBA. *Dub.*

THE herb, when fresh, has a pleasant smell, which, however, it loses on being dried. Its taste is then bitterish and astringent. Lewis got from it an essential oil of a yellow colour. Its decoction was formerly used as an astringent for a gargle, and in diarrhœa and leucorrhœa.

ALCOHOL FORTIUS. *Ed.*
SPIRITUS VINOSUS RECTIFICATUS. *Dub.*
SPIRITUS RECTIFICATUS. *Lond.*
Alcohol, rectified spirit of wine.

The specific gravity should be, according to the London and Edinburgh colleges, to that of water, as 835 to 1000. The Dublin college order it of the specific gravity 840.

Alcohol is the characteristic principle of vinous liquors. It arises from the decomposition of sugar by fermentation, and is found in greatest quantity in the wines of warm countries, prepared from thoroughly ripened fruit. In our home-made wines, sugar is added to compensate for the want of it in our acescent fruits, and some of them, according to Brande's experiments, yield more alcohol than any foreign wine. It is the proportion of alcohol which renders wines more or less generous, and prevents them from becoming sour. The richer a wine is in alcohol, the less malic acid it contains; and therefore the best wines give the best brandy, because they are free from the disagreeable taste which the malic acid imparts to it. Old wines give better brandy than new wines, but less of it.

Alcohol is separated from vinous liquors by distillation; in conducting which, the following rules are to be observed:

1. To heat the whole mass of fluid at once, and equally.
2. To remove all obstacles to the ascent of the vapour.
3. To condense the vapour as quickly as possible.

The distillation is continued until the liquor which comes over is not inflammable. The spiritous liquor obtained by the first distillation is very much diluted, and is called *Low wines.* These are redistilled or rectified to render them stronger. But even rectified spirit of wine contains much water, to free it from which the aid of chemical agents is necessary.

Dealers judge of the strength of spirits by the size and durability of the bubbles they form, when poured from one vessel into another, or on agitating them in a vessel partly filled. Another proof is, by the combustion of gunpowder; some of which is put in a spoon, and then covered with the spirit to be tried, which is set on fire; if the gunpowder be kindled, the spirit is supposed to be strong, and *vice versa.* But a small quantity of spirits will always kindle gunpowder, and a large quantity never. Another proof is by the carbonate of potass, which attracts the water, and dissolves in it, while the alcohol swims above, and the strength of the spirits is judged of by its quantity. But all these are uncertain; and dependence can only be put in the proof by hydrometers, or some other contrivance for ascertaining the weight of a given bulk at a given temperature.

In this country, alcohol is procured from an infusion of malt, and before its rectification is termed Whisky. In the East Indies, arrack, a spiritous liquor, is distilled from rice; in the West Indies, rum from the sugar-cane; and in France and Spain, brandy from wine. Of these, the French brandy is the finest spirit; for the others are more or less impregnated with unpleasant essential oils, of which it is almost impossible to free them entirely.

Pure or absolute alcohol is a transparent colourless liquid, of an agreeable penetrating smell, and pungent burning taste: specific gravity 0.8. It remains fluid in the greatest natural or artificial cold. It boils at 176°, and in *vacuo* at 56°. Alcohol unites with water in every proportion. During the combination, caloric is evolved, and the specific gravity of the compound is greater than the mean of those of the components. Alcohol dissolves about 60 of sulphur, when they are presented to each other in a state of vapour. It also dissolves a little phosphorus. These solutions are decomposed by water. It dissolves the boracic and carbonic acids, ammonia, soda, and potass, and is the means employed to obtain the two last in a state of purity. Its action on the salts is various. It dissolves the volatile oils, resins, soaps, balsams, camphor, sugar, extractive, the compound vegetable alkalies, and in part the gummy resins. Alcohol is very inflammable, and when kindled burns entirely away, with a blue flame without smoke. The products of its combustion are carbonic acid and water. It is also decomposed by being transmitted in the state of vapour through a red-hot porcelain tube; by being heated with the fixed alkalies; and by the action of the sulphuric, nitric, and acetic acids, and of chlorine. Its elements correspond with those of two volumes of olefiant gas and one volume of water, or are 3 of hydrogen, 2 of carbon, and 1 of oxygen, by weight 0.375 *h*, 1.5 *c*, and 1 *o*.

Medical uses.—On the living body alcohol acts as a most violent stimulus. It coagulates all the albuminous and gelatinous fluids, and corrugates all the solids. Applied externally, it contracts the caliber of the vessels, and thus may restrain passive hæmorrhagies. It instantly contracts the extremities of the nerves it touches, and deprives them of sense and motion; by this means easing them of pain, but at the same time destroying their use. Alcohol taken undiluted into the stomach produces the same effects, contracting all the solid parts which it touches, and destroying, at least for a time, their use and office; if the quantity be considerable, a palsy or apoplexy follows, which ends in death. Taken in small quantity, and diluted, it acts as a cordial and tonic, raises the pulse, stimulates the stomach, and promotes digestion; if longer continued, the senses get disordered, voluntary motion is destroyed, and at length death itself ensues. Vinous spirits therefore, in small doses, and properly diluted, may be applied to useful purposes in the cure of diseases; whilst in larger ones they produce deleterious effects. Its habitual use produces the most lamentable consequences,—dyspepsia, hypochondriasis, visceral obstructions, dropsy, tremours and paralysis.

ALCOHOL DILUTIUS. *Ed.*
SPIRITUS VINOSUS TENUIOR. *Dub.*
SPIRITUS TENUIOR. *Lond.*

Diluted Alcohol. Spirit of wine. Proof spirit.

WEAKER ALCOHOL is by the Edinburgh College directed to be prepared by mixing the rectified spirit of 835 with an equal bulk of water, and the specific gravity of the mixture is to that of distilled water as 935 to 1000. *(Ed.)* The London and Dublin Colleges order it to have the specific gravity of 930; and the latter adds, " Almost all the spirit sold under the name of *Proof spirit* is contaminated with empyreumatic oil, and unfit for medical use. A spirit of nearly the same specific gravity is prepared by mixing four measures of rectified spirit with three measures of distilled water, and this should always be employed in the preparation of tinctures."

Diluted alcohol should always be prepared, by mixing rectified spirit with water; but it is hardly to be expected that apothecaries will either be at the trouble or expense of preparing it in this manner. Instead of it, an impure spirit of the requisite strength is commonly employed. The diluted alcohol of the Edinburgh college is somewhat weaker than that of the two other colleges; but besides that it is more convenient for their mode of preparing it, this will be attended with no disadvantage, as it is still sufficiently strong for any ordinary purpose.

TABLE *of various mixtures of Alcohol and Water, shewing their Specific Gravities according to Gilpin at* 60° *and* 55°, *and their degrees according to Baumé's hydrometer, and also in Clark's hydrometer.*

Water.	Alcohol.	Sp. Gr. 60°	Sp. Gr. 55°	Baumé 55°
0	100	.825	.82736	38
10	100	.84568	.84802	34+
20	100	.86208	.86441	30—
30	100	.87569	.87796	29+
40	100	.88720	.88945	27+
50	100	.89707	.89933	25+
60	100	.90549	.90768	23—
70	100	.91287	.91502	22
80	100	.91933	.92145	21—
90	100	.92499	.92707	20—
100	100	.93002	.93208	19—
100	90	.93493	.93696	19+
100	80	.94018	.94213	18
100	70	.94579	.94767	17—
100	60	.95181	.95357	16—
100	50	.95804	.95966	16
100	40	.96437	.96575	15
100	30	.97074	.97181	14+
100	20	.97771	.97847	13
100	10	.98654	.98702	12
100	0	1.		10

Sp. Gr. 60°	Clark's Hydrom.
833	Spirit of Wine
858	1 to 2
881	1 to 3
891	1 to 4
896	1 to 5
900	1 to 6
904	1 to 7
907	1 to 8
909	1 to 9
910	1 to 10
913	1 to 15
916	1 to 20
920	Proof Spirit.
926	1 in 20
928	1 in 15
932	1 in 10
933	1 in 9
934	1 in 8
936	1 in 7
938	1 in 6
942	1 in 5
945	1 in 4
954	1 in 3
964	1 in 2

ALLIUM.

Wild. *g.* 626.—*Hexandria Monogynia* —Nat. ord. *Liliaceæ,* Linn. Juss.

Sp. 14. ALLIUM SATIVUM. *Ed. Dub. Lond.*
Garlic.

Officinal.—The root.
ALLII RADIX. *Lond. Dub.*
ALLII SATIVI RADIX. *Ed.*

GARLIC is a perennial bulbous-rooted plant, which grows wild in Sicily, and is cultivated in our gardens. The root consists of five or six small bulbs called *cloves,* inclosed in one common membranous coat, but easily separable from each other. All the parts of this plant, but more especially the root, have a strong offensive, very penetrating, and diffusible smell, and an acrimonious, almost caustic taste. The root is full of a limpid juice, of which it furnishes almost a fourth part of its weight by expression.

The active ingredient is, according to Hagen, a yellowish thick ropy essential oil, of which the proportion is very small, but in which alone reside the smell, the taste, and all that distinguishes the garlic. This is confirmed by Cadet De Gassicourt and Bouillon La Grange, who also found it to contain sulphur, vegetable albumen and saccharine matter. By decoction the virtues of garlic are entirely destroyed; but its peculiar virtues are in some degree extracted by alcohol and acetic acid.

Medical use.—Applied externally, it acts successively as a stimulant, rubefacient, and blister. Internally, from its very powerful and diffusible stimulus, it is often useful in diseases of languid circulation and interrupted secretion. Hence, in cold leucophlegmatic habits, it proves a powerful expectorant, diuretic, and, if the patient be kept warm, sudorific; it has also been by some supposed to be emmenagogue. For the same reason, in cases in which a phlogistic diathesis, or irritability, prevails, large doses of it may be very hurtful.

It is sometimes used by the lower classes as a condiment, and also enters as an ingredient into many of the epicure's most favourite sauces. Taken in moderation, it promotes digestion; but in excess, it is apt to produce headach, flatulence, thirst, febrile heat, and inflammatory diseases, and sometimes occasions a discharge of blood from the hæmorrhoidal vessels.

In this country garlic is scarcely prescribed by practitioners, and is not much used as a domestic remedy. In its effects it corresponds with those of the squill, and they may be substituted for each other.

Garlic may be exhibited in substance, and in this way several cloves may be taken at a time without inconvenience, or the cloves cut into slices may be swallowed without chewing. This is the common mode of exhibiting it for the cure of intermittents.

The expressed juice is acrid and nauseous, and unfit for internal use. In deafness, cotton moistened with the juice is introduced within the ear, and the application renewed five or six times in one day.

An infusion of an ounce of bruised garlic in a pound of milk was the mode in which Rosenstein exhibited it to children afflicted with worms.

The most commodious form for administering garlic is that of a pill or bolus conjoined with some powder, corresponding with the intention of giving the garlic. It may also sometimes be exhibited with advantage in the form of a clyster.

Garlic made into an ointment with oils, &c. and applied externally, is said to resolve and discuss indolent tumours, and has been by some greatly esteemed in cutaneous diseases. It has likewise sometimes been employed as a repellent. When applied under the form of a poultice to the pubes, it has sometimes proved effectual in producing a discharge of urine, when retention has arisen from a want of due action in the bladder. Sydenham assures us, that among all the substances which occasion a derivation or revulsion from the head, none operates more powerfully than garlic applied to the soles of the feet: with this intention he used it in the confluent small-pox, about the eighth day, after the face began to swell. The root cut in pieces, and tied in a linen cloth, was applied to the soles, and renewed once a day till all danger was over.

Sp. 43. ALLIUM CEPA. *Dub.*
Onion.

Officinal.—The root.
CEPÆ RADIX. *Dub.*

This is also a perennial bulbous-rooted plant. The root is a simple bulb, formed of concentric circles. It possesses in general the same properties as the garlic, but in a much weaker degree. When distilled by Neumann, the whole flavour of the onion passed over, but no oil could be obtained.—Wiegleb says, that all this class of vegetables, as well as the acrid cruciform, owe their acrimony to a subtile essential oil, and that they contain combined ammonia, which can be obtained by distillation with a solution of potass. Vauquelin ascribes its acrimony to volatile oil combined with sulphur, and its sweetness to uncrystallizable sugar with mucus, gluten and animo-vegetable matter.

Medical uses.—Onions are considered rather as an article of food than of medicine: by their stimulating quality they tend to excite appetite, and promote the secretions; but when eaten liberally they produce flatulence, occasion thirst, headach, and turbulent dreams. By some they are strongly recommended in suppression of urine, and in dropsies. The chief medicinal use of onions in the present practice is in external applications, as a cataplasm for suppurating tumours, &c.

Sp. 2. ALLIUM PORRUM. *Lond.*
Leek.
Off.—The root.
PORRI RADIX. *Lond.*

THE common leek is rather an article of the Materia Alimentaria, than of the Materia Medica. It is milder even than the common onion. A decoction of the beards or filaments of the bulbs is supposed by the vulgar to be lithontriptic.

ALOE.
Willd. *g.* 659.—*Hexandria Monogynia.*—Nat. Ord. *Liliaceæ*, Linn. & Juss.

Sp. 5. ALOE SINUATA? *Dub.*
Off.—The gum resin or extract, called Hepatic Aloes.
ALOE HEPATICA; Extractum. *Ed.*
ALOE HEPATICA; gummi resina. *Dub.*

HEPATIC aloes is of two kinds, one from the East Indies, the other from Barbadoes. The former has a light brown, or reddish-yellow colour; a clean fracture, and possesses nearly the same medical properties as the socotorine. Barbadoes aloes is not so clear and bright as the foregoing sort; it is also of a darker colour, more compact texture, and for the most part drier, though not so brittle. Its smell is much stronger and more disagreeable; the taste intensely bitter and nauseous, with little or nothing of the aromatic flavour of the socotorine. The best hepatic aloes from Barbadoes is in large gourd shells; and an inferior sort, which is generally soft and clammy, is brought over in casks. In Barbadoes the plant is pulled up by the roots, and carefully cleaned from the earth and other impurities. It is then sliced into small hand-baskets and nets, which are put into large iron boilers with water, and boiled for ten minutes, when they are taken out, and fresh parcels supplied till the liquor is strong and black, which is then strained into a deep vat, narrow at bottom, where it is left to cool and to deposite its feculent parts. Next day the clear liquor is drawn off by a cock, and again committed to a large iron vessel. At first it is boiled briskly, but towards the end it is slowly evaporated, and requires constant stirring to prevent burning. When it becomes of the consistence of honey, it is poured into gourds or calabashes for sale, and hardens by age. Barbadoes aloes is extremely apt to induce hæmorrhoids; but it is generally preferred, because it is very difficult to adulterate it without altering its appearance.

Sp. 2. ALOE SPICATA. *Dub. Lond.*

Off.—The gum resin or extract, called Socotorine Aloes.

ALOES SPICATÆ EXTRACTUM. *Lond.*

ALOE SOCOTORINA; gummi-resina. *Dub.*

ALOE SOCOTORINA. *Ed.*

THIS kind of aloes, which is the most esteemed, is brought, wrapped in skins, from the island of Socotora in the Indian Ocean. It is dark coloured, of a glossy clear surface, and in some degree pellucid; in mass of a yellowish-red colour, with a purple cast; fracture unequal; easily pulverizable; when reduced to powder, of a bright golden colour. It is hard and friable in the winter, somewhat pliable in summer, and growing soft between the fingers. Its taste is bitter and disagreeable, though accompanied with some aromatic flavour; the smell is not very unpleasant, and somewhat resembles that of myrrh. It is said not to produce hæmorrhoidal affections so readily as Barbadoes aloes.

It is prepared in July, by pulling off the leaves, from which the juice is expressed, and afterwards boiled and skimmed. It is then preserved in skins, and dried in August in the sun. According to others, the leaves are cut off close to the stem, and hung up. The juice, which drops from them without any expression, is afterwards dried in the sun.

During the first four years that the Cape of Good Hope was in possession of the British, more than 300,000 pounds, the produce of that settlement, were imported into England; and as this quantity was infinitely greater than could be required for the purposes of medicine, it is not improbable, that, as Mr Barrow states, its principal consumption was by the London porter brewers.

FETID, CABALLINE, or HORSE ALOES.

THIS is easily distinguished from both the foregoing kinds by its strong rank smell; although, in other respects, it agrees pretty much with the hepatic. Sometimes the caballine aloes is prepared so pure and bright, as not to be distinguishable by the eye even from the socotorine; but its offensive smell, of which it cannot be divested, readily betrays it. Its fracture also resembles that of common rosin, with which it is often adulterated, whereas the fracture of socotorine aloes is unequal and irregular.

According to Neumann's analysis, 1000 parts of aloes contain about 7.8 soluble in water only, or analogous to gum,

YORKSHIRE COLLEGE,

94. soluble in alcohol only, or resinous matter, and 895 soluble both in alcohol and in water or extractive. Different proportions have been got by other chemists, from different varieties of aloes, and Braconnot has described the extraction as a peculiar principle under the title of aloesin. The resins of all the sorts, purified by alcohol, have little smell; that obtained from the socotorine has scarcely any perceptible taste; that of the hepatic is slightly bitterish; and the resin of the caballine has a little more of the aloetic flavour. The extractive obtained separately from any of the kinds, is less disagreeable than the crude aloes: the extractive of socotorine aloes has very little smell, and is in taste not unpleasant; that of the hepatic has a somewhat stronger smell, but is rather more agreeable in taste than the extract of the socotorine: the extractive of the caballine retains a considerable share of the peculiar rank smell of this sort of aloes, but its taste is not much more unpleasant than that of the extractive obtained from the two other sorts. Fabbroni discovered that the juice expressed from the thick leaves acquired a beautiful purple colour in the air, and furnished a permanent dye.

Medical use.—Aloes is a bitter stimulating purgative, exerting its action chiefly on the rectum. In doses of from 5 to 15 grains it empties the large intestines, without making the stools thin; and likewise warms the habit, quickens the circulation, and promotes the uterine and hæmorrhoidal fluxes. If given in so large a dose as to purge effectually, it often occasions an irritation about the anus, and sometimes a discharge of blood.

It is frequently employed in cases of suppression of the menses, or of the hæmorrhoidal discharge; but it is particularly serviceable in habitual costiveness, to persons of a phlegmatic temperament and sedentary life, and where the stomach is oppressed and weakened. For its use in typhus fever, scarlatina, cynanche maligna, marasmus, chlorosis, hæmatemesis, chorea, hysteria, and tetanus, Dr Hamilton's excellent work on Purgatives may be consulted. Aloes is also used as an anthelmintic, both given internally and applied to the abdomen in the form of a plaster. Dissolved in alkohol, it is employed to check hæmorrhagies in recent wounds, and as a detergent in ulcers.

Some are of opinion, that the purgative virtue of aloes resides entirely in its resin; but experience has shewn, that the pure resin has little or no purgative quality, and that the extractive part separated from the resinous acts more powerfully than the crude aloes. If the aloes indeed be made to undergo long coction in the preparation of the gummy extract, its cathartic power will be considerably lessened, not from the separation of the resin, but from an alteration made in the extractive itself by the action of the heat and air. The strongest vegetable cathartics become mild by a similar treatment.

Socotorine aloes, as already observed, contains more extractive than the hepatic; and hence it is likewise found to purge more, and with greater irritation. The first sort, therefore, is most proper where a stimulus is required, as for promoting or exciting the menstrual flux; whilst the latter is better calculated to act as a common purge.

Aloes is administered either,

a. Alone, or

b. In composition:

1. With purgatives. Soap, scammony, colocynth, rhubarb.
2. With aromatics. Canella.
3. With bitters. Gentian.
4. With tonics. Iron, myrrh.
5. With fetids. Assafœtida.

It is exhibited in the form of

a. Powder; too nauseous for general use.

b. Pill; the most convenient form.

c. Solution in wine or diluted alcohol.

ALTHÆA OFFICINALIS. *Ed. Lond.*

Willd. *g.* 1289, *sp.* 1.—*Smith's Flor. Brit. g.* 316, *sp.* 1.—*Monadelphia Polyandria.* — Nat. ord. *Columnaceæ,* Linn., *Malvaceæ,* Juss.

Marsh-mallow.

Off.—The root and leaves.

a) ALTHÆÆ OFFICINALIS RADIX. *Ed.*
ALTHÆÆ RADIX. *Lond.*

b) ALTHÆÆ OFFICINALIS FOLIUM. *Ed.*
ALTHÆÆ FOLIA. *Lond.*

THE marsh-mallow is a perennial indigenous plant, which is found commonly on the banks of rivers, and in salt marshes. The whole plant, but especially the root, abounds with mucilage. The roots are about the thickness of a finger, long and fibrous. When peeled and dried, they are perfectly white, and certain districts of France are celebrated for producing them of fine quality. They contain much mucilage with some saccharine principle. I found that the decoction of the root reddens turnsole, and gelatinizes silicized potass.

Med. use.—It is used as an emollient and demulcent, in diseases attended with irritation and pain, as in various pulmonary complaints, and in affections of the alimentary canal and urinary organs; and it is applied externally in emollient fomentations, gargles, and clysters, and a favourite lozenge is named from it, *Pate de Guimauve.*

ALUMEN. Sulphas aluminæ et potassæ. *Ed.*
ALUMEN, s. s. Supersulphas aluminæ et potassæ. *Lond.*
ALUMEN, s. s. Supersulphas argillæ alcalisatæ. *Dub.*
Supersulphate of alumina and potass. Alum.
Sulphate of alumina and potass.

ALUM is obtained principally from schistose clays, which are intimately incorporated with iron pyrites.

The Alum works of Hurlet and Nitshill, in the vicinity of Paisley, are supplied with aluminous schist from the old workings of coal pits in the neighbourhood. The schist, after being long exposed to a still, humid, subterranean atmosphere, is more or less split into layers, by the efflorescence (crystallization) of the sulphates of alumina and iron in its substance. By lixiviation these are extracted, and the two salts are separated from one another by the greater insolubility of the sulphate of iron, which crystallizes, while the sulphate of alumina still remains dissolved. A solution of a salt of potash is now added to the solution of the sulphate of alumina, to form alum. The addition of an alkali is absolutely necessary, as alum is a triple or even quadruple salt, with excess of acid, consisting of sulphuric acid and alumina, with potass or ammonia, or both of them. After several solutions and crystallizations the alum is rendered very pure.

When no more salts can be procured from the schist by lixiviation, it is piled into heaps, along with brushwood and coals, and the whole set on fire. The combustion is kept as languid as possible; and after it is finished, the schist is lixiviated. By the process of roasting which the schist has undergone a quantity of sulphate of alumina is formed, but the sulphate of iron is destroyed by the heat. Alum is formed from the sulphate of alumina now procured, by the process already described.

Near Whitby there are considerable works where alum is made by burning a sulphuret of alumina, which is found there in the form of a soft grey clay, lying under a stratum of sand stone, and by adding muriate of potass to the ley of sulphate of alumina thus obtained.

Alum crystallizes in regular octohedrons, whose sides are equilateral triangles. It has a sweetish but very astringent taste. It is soluble in 15 times its weight of water at 60°, and in three-fourths of its weight at 212°. It reddens vegetable blues. It effloresces slightly in the air. By the action of heat it first undergoes the watery fusion, then loses its water of crystallization, and lastly great part of its acid. It is decomposed by baryta, potass, soda, strontia, and all salts of which these are the bases; by the nitrate, muriate, phosphate, carbonate, borate, and fluate of ammonia; by the nitrate, muriate, phosphate, and carbonate of magnesia; and by the nitrate, muriate, and carbonate of lime. It is also decomposed by the gallic acid, by colouring matters, and by many animal and vegetable substances.

There are three varieties of alum, which agree in the form of their crystals, and in some particulars of their composition They all contain 25 atoms of water of crystallization, and 3 atoms of sulphate of alumina; but in the most common variety there also exists an atom of sulphate of potash; in the other varieties there is an atom of sulphate of soda, or of sulphate of ammonia. Dr Thomson has pointed out how singularly they differ in their solubility in water. The medical properties of alum do not seem to be affected by the nature of the alkali.

Medical use. – Alum is a powerful astringent; it is reckoned particularly serviceable for restraining hæmorrhagies and immoderate secretions; but less proper in intestinal fluxes. In violent hæmorrhagies, it may be given in doses of fifteen or twenty grains, repeated every hour or half hour till the bleeding abates. It is used also externally, in astringent and repellent lotions and collyria. Dr Scudamore has recommended greatly a saturated solution of alum in free doses in hæmoptysis and hæmatemesis. In other cases, smaller doses are more advisable, large ones being apt to nauseate the stomach, and occasion violent constipations of the bowels. Burnt alum, taken internally, has been highly extolled in cases of colic. In such instances, when taken to the extent of a scruple for a dose, it has been said gently to move the belly, and give very great relief from the severe pain.

AMMONIACUM. *Gummi resina.* *Lond. Dub. Ed.*
Ammoniac, a gum-resin.

AMMONIACUM is a concrete, gummy-resinous juice, brought from the East Indies, usually in large masses, composed of little lumps or tears, of a milk white colour, but soon changing, upon being exposed to the air, to a yellowish hue.

Gum-ammoniac is now referred by the London and Edinburgh Colleges, on the authority of Willdenow, to the ***Heracleum gummiferum***, which he raised from seeds taken out of the Ammoniacum of the shops; although he could not procure any gum from the plants raised at Berlin, nor had they any of the sensible qualities of ammoniac. By comparing the figure of the Heracleum gummiferum in the ***Flora Berolinensis*** with the sufficiently characteristic figure, which Mr Jackson, unfortunately not a botanist, but perfectly familiar with the ammoniac plant, has published in his account of the empire of Morocco, I have not a doubt that they are quite different plants. Mr J. gives the following account of it: " *Ammoniacum*, called ***Feshook*** in Arabic, is produced from a plant similar to the European fennel, but much larger. In most of the plains of the interior, and particularly about El Araiche and M'sharrah Rummillah, it grows ten feet high. The Gum ammoniac is procured by incisions in the branches, which, when pricked, emit a lacteous glutinous juice, which being hardened by the heat of the sun, falls on the ground, and mixes with the red earth below; hence the reason that Gum ammoniac of Barbary does not suit the London market. It might, however, with a little trouble, be procured perfectly pure; but when a prejudice is once established against any particular article, it is difficult to efface it. The gum, in the above-mentioned state, is used in all parts of the country, for cataplasms and fumigations. The sandy light soil which produces the gum ammoniac abounds in the north of Morocco. It is remarkable that neither bird nor beast is seen where this plant grows, the vulture only excepted. It is, however, attacked by a beetle, having a long horn proceeding from its nose, with which it perforates the plant, and makes the incisions whence the gum oozes out."

Ammoniacum has a nauseous sweet taste, followed by a bitter one; and a peculiar smell, somewhat like that of galbanum, but more grateful: it softens in the mouth, and acquires a white colour upon being chewed. It softens by heat, but is not fusible; when thrown upon live coals, it burns away in flame: it is in some degree soluble in water and in vinegar, with which it assumes the appearance of milk; but the resinous part, amounting to about one-half, subsides on standing.

Neumann extracted from 480 parts, 360 by alcohol, and then by water 105; by water applied first 410, and then by alcohol 60. Alcohol distilled from it arose unchanged, but water acquired a sweetish taste, and the smell of the ammoniac. More modern chemists say that the spirit drawn from it by distillation smelt strongly of the gum, and that a small portion of a very pungent strong smelling oil could be got from it. The solution in alcohol is transparent; but on the addition of water becomes milky. It therefore seems to consist principally of a substance soluble both in water and in alcohol, combined with some volatile matter. Braconnot makes it consist of 700 resin, 184 gum, 44 gluten, and 60 water.

Such tears as are large, dry, free from small stones, seeds, or other impurities, should be picked out and preferred for internal use; the coarser kind is purified by solution, colature, and careful inspissation; but unless this be artfully managed, the gum will lose a considerable deal of its more volatile parts. There is often vended in the shops, under the name of strained gum ammoniacum, a composition of ingredients much inferior in virtue.

Medical use.—The general action of gum-ammoniac is stimulant. On many occasions, in doses of from ten to thirty grains, it proves a valuable antispasmodic, deobstruent, or expectorant. In large doses, it purges gently, excites perspiration, and increases the flow of urine. It is used with advantage to promote expectoration in some pulmonary diseases, especially asthma and chronic catarrh; in dropsical affections, to augment the flow of urine, and to support the salivation in small pox. It is also an useful deobstruent; and is frequently prescribed for removing obstructions of the abdominal viscera, and in hysterical disorders, occasioned by a deficiency of the menstrual evacuation. In long and obstinate cholics, proceeding from viscid matter lodged in the intestines, this gummy resin has produced good effects, after purges and the common carminatives had been used in vain. Externally, it is supposed to soften and ripen hard tumours, is often applied as a discutient in white swellings of the knee and other indolent tumours. A solution of it in vinegar has been recommended by some for resolving even schirrous swellings.

It is exhibited internally,

a. In solution, combined with vinegar, vinegar of squills, assa fœtida, &c.

b. In pills, with bitter extracts, myrrh, assa fœtida.

c. And externally, dissolved in vinegar, combined with turpentine, common plaster, &c.

AMMONIÆ MURIAS, S. S. Murias ammoniæ. *Lond.*
MURIAS AMMONIÆ. *Ed.*
SAL AMMONIACUM, S. S. Murias ammoniæ. *Dub.*

Muriate of ammonia. Sal ammoniac.

MURIATE of ammonia is found native, especially in the neighbourhood of volcanoes. It was first prepared in Egypt from the soot of camel-dung by sublimation; but the greatest part of that now used is manufactured in Europe, either by combining ammonia directly with muriatic acid, or by decomposing the sulphate of ammonia by means of muriate of soda; or the muriates of lime and magnesia by means of carbonate of ammonia.

In commerce, muriate of ammonia occurs, either sublimed in firm, round, elastic, concavo-convex cakes, or crystallized in conical masses. The latter commonly contain other salts, especially muriate of lime, which renders them deliquescent; and, therefore, the sublimed muriate of ammonia is to be preferred for the purposes of medicine.

Muriate of ammonia has an acrid, pungent, urinous taste. It is soluble in about three times its weight of water at 60°, and in an equal weight at 212°. During its solution, it produces 32° of cold. It is also soluble in about 4.5 parts of alcohol. It is permanent in the ordinary state of the atmosphere. By a gentle heat, it is reduced to the form of a white powder. At a higher temperature it sublimes unchanged. Its crystals are either six-sided pyramids, aggregated in a plumose form, or, still more commonly, four-sided pyramids. It is an anhydrous salt, and consists of 1 atom of muriatic acid 4.625, and 1 atom of ammonia, 2.125; or of 1 atom of chlorine 4.5, 1 atom of nitrogen 1.75, and 4 atoms of hydrogen, $0.5 = 6.75$. It is decomposed by the sulphuric and nitric acids; by baryta, potass, soda, strontia, and lime; by several secondary salts containing these acids or bases; and by those metalline salts whose bases form with muriatic acid an insoluble compound.

Medical use.—Muriate of ammonia is, in this country, seldom used internally. It was formerly supposed to be a powerful aperient and attenuant of viscid humours.

Externally applied, it is a valuable remedy. It may act in two ways.

1. By the cold produced during its solution.

It is from this cause that fomentations of muriate of ammonia probably prove beneficial in mania, apoplexy from plethora, lesions of the head, and in violent headachs. When used with this intention, the solution should be applied as soon as it is made.

2. By the stimulus of the salt.

On this principle we may explain its action as a discutient, in indolent tumours of all kinds, contusions, gangrene, psora, ophthalmia, cynanche, and in stimulating clysters. In some cases, as in chilblains, and other indolent inflammations, both modes of action may be serviceable. When first applied, the coldness of the solution will diminish the sense of heat and uneasiness of the part, and the subsequent stimulus will excite a more healthy action in the vessels.

AMOMUM.

Willd. *g.* 4.—*Monandria Monogynia.*—Nat. ord. *Scitamineæ*, Linn., *Ammomeæ*, Juss., *Drymyrrhizæ*, Decandolle.

Sp. 1. AMOMUM ZINGIBER, Willd. *Ed. Dub.*
ZINGIBER OFFICINALE, Roscoe. *Lond.*

Ginger.

Off. a)—The dried root, the ginger of the shops.
AMOMI ZINGIBERIS RADIX. *Ed.*
ZINGIBERIS RADIX. *Lond.*

b) Preserved ginger imported from the East or West Indies.
ZINGIBERIS RADIX CONDITA. *Dub.*

IN the botanical arrangement of the well-known plant which produces the Ginger, the London College have followed Mr Roscoe of Liverpool, who has given a new classification of the Scitamineous plants, in the eighth volume of the Linnæan Society, in which he has separated the Zingiber from the Cardamom.

Ginger is a perennial plant, indigenous in the East Indies, but now cultivated in the West-India islands. It is cultivated there very much in the same manner as potatoes are here, and is fit for digging once a-year, unless for preserving in syrup, when it should be dug at the end of three or four months, at which time it is tender and full of sap.

Ginger is distinguished into two sorts, the black and the white. The former is rendered fit for preservation by means of boiling water, the latter by insolation; and as it is necessary to select the fairest and roundest roots for exposure to the sun, white ginger is commonly one-third dearer than black.

Black ginger consists of thick and knotty roots, internally of an orange or brownish colour, externally of a yellow-grey. White ginger is less thick and knotty, internally of a reddish-yellow, and externally of a whitish-grey or yellow. It is firm and resinous, and more pungent than the black. Pieces which are worm-eaten, light, friable, or soft, and very fibrous, are to be rejected.

Ginger has a fragrant smell, and a hot, biting, aromatic taste.

Ginger root has been, 1823, well analysed by M. Morin, as it had been in 1817 by M. Bucholz. Their results agree as nearly as could be expected from their different modes of procedure.

M. Morin acted upon the root first with alcohol of 0.827, and from the tincture by distillation; and subjecting the residuum successively to the action of water, ether, and solution of potass, he got a volatile oil of greenish blue colour, a little extract like osmazome, acetate of potass, and acetic acid; a soft brownish yellow resin, acrid, aromatic, and soluble in ether and alcohol; and a sub-resin insoluble in ether. From the remainder of the root, by the action of cold water, first by maceration, and then by beating and bruising, he got gummy matter, animo-vegetable matter, osmazome? sulphur, starch, and lignin. The fibre burnt yielded carbonate and muriate of potass, with traces of other salts.

M. Bucholz used *boiling* water after the principles soluble in alcohol were removed, by which some of the principles, as the starch, would be altered; but his results were, from 1000 grains, oil 15.6, soft resin 36, extractive 111.5, gummy extractive 260, gum 120.5, starch 197.5, tragacanthin 83, lignin 80, moisture 119 = 1023.1.

Preserved ginger should be prepared in India from the young and succulent roots. When genuine, it is almost transparent. That manufactured in Europe is opaque and fibrous.

Medical use.—Ginger is a very useful spice in cold flatulent colics, and in laxity and debility of the intestines; it does not heat so much as the peppers, but its effects are more durable. It may also be applied externally as a rubefacient. Lately, the powder of ginger, taken in very large doses in milk, acquired the reputation of being almost specific in the gout.

Sp. 3. AMOMUM ZEDOARIA. *Dub.*
Long Zedoary.

Off.—The root.

Zedoariæ radix. *Dub.*

The zedoary is perennial, and grows in Ceylon and Malabar. The roots come to us in pieces, some inches in length, and about a finger thick. Externally they are wrinkled, and of an ash-grey colour, but internally they are brownish-red. The best kind comes from Ceylon, and should be firm, heavy, of a dark colour within, and neither worm-eaten nor very fibrous. It has an agreeably fragrant smell, and a warm, bitterish, aromatic taste.

M. Morin also analyzed zedoary, to ascertain whether roots of the same botanical genus agreed in chemical principles, and there was no difference except in the absence of sub-resin. M. Bucholz got volatile oil 14.2, balsam (resin of Morin) 36, extractive 117.5, gummy extractive 312, gum 45, starch 116, tragacanthin 90, lignin 128. moisture 150 =1008.7; but what was remarkable, he found in the ashes, oxide of copper, which he afterwards got in other vegetables.

The galanga root of the same family was analysed by both chemists. According to Morin, it differed considerably from the others in being totally destitute of animo-vegetable matters, having very little osmazome; the resin being harder; having a large proportion of sub-resin, and a proportion of oxalate of lime. Bucholz got balsam (soft resin) 49, volatile oil 5, extractive 97, gum 82.25, tragacanthin 414.5, moisture 122.5, lignin 216.5=986.75.

Sp. 7. Amomum cardamomum. *Dub.*

Sp. 10. ——— repens. *Ed.*

Matonia cardamomum. *Lond.* Smith *in* Rees' *Cyclopedia.*

Lesser Cardamom.

Off.—Lesser cardamom seeds.

Amomi repentis semen. *Ed.*

Cardamomi semina. *Lond.*

Cardamomi minoris semina. *Dub.*

Both of these species of Amomum are natives of India. The Edinburgh College, on the authority of Sonnerat, has supposed these seeds to be the product of the *repens*, while the Dublin College, with Murray, Willdenow, and all the foreign pharmaceutical writers, ascribe them to the *cardamomum;* and to increase the confusion, the London College have referred this last to a new genus; which Dr Maton,

" from an accurate description of the plant communicated to the Linnæan Society by Mr White, surgeon, Madras, named *Elettaria*, from the appellation of *Ellettari*, originally given to this tribe by Van Reed, in his *Hortus Malabaricus*, and is now called by Dr Smith, Matonia.

Cardamom seeds are very warm, grateful, pungent, aromatic, and frequently employed as such in practice. From 480 parts Neumann got about 20 of volatile oil, 15 of resinous, and 45 of watery extract. The husks of the seeds, which have very little smell or taste, may be commodiously separated, by committing the whole to the mortar, when the seeds will readily pulverize, so as to be freed from the husk by the sieve: this should not be done till just before using them; for if kept without the husks, they soon lose considerably of their flavour.

AMYGDALUS COMMUNIS. *Ed. Dub. var. β and γ Lond.*

Willd. *g.* 981. *sp.* 2. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ*, Linn., *Rosaceæ*, sect. *Drupaceæ*, Juss.

The almond tree.

Off. a)—The kernel; sweet almonds.

AMYGDALI COMMUNIS NUCLEI. Amygdalæ dulces ex varietate sativa. *Ed.*

AMYGDALÆ DULCES. *Dub. Lond. var. β.*

b) The kernel; bitter almonds.

AMYGDALÆ AMARÆ. *Lond. var. γ.*

The almond tree nearly resembles the peach. It originally came from Syria and Barbary, but is now much cultivated in the south of Europe. There is no apparent difference between the trees which produce the sweet and bitter almonds, and very little betwixt the kernels themselves; and it is even said, but without probability, that the same tree has, by a difference in culture, afforded both.

The almond is a flattish kernel, of a white colour, and of a bland sweet taste, or a strong bitter one. The skins of both sorts are thin, brownish, unpleasant, and covered with an arid powdery substance. They are very apt to become rancid on keeping, and to be preyed on by insects, which eat out the internal part, leaving the almond to appearance entire. To these circumstances regard ought to be had in the choice of them.

The true composition of the kernel of the almond, and of emulsive seeds in general, was first made known by Boullay. They were formerly supposed to consist chiefly of amylaceous matter with oil, but he shewed that they contain no starch, and that 100 parts are composed of fixed oil 54, albumen 24, liquid sugar 6, gum 3, fibre 4, pellicles 5, water 3.5, loss and acetic acid 0.5; so that, in fact, they are analogous to a concrete milk, and almond emulsion may be truly considered as a vegetable milk, and by coagulating the albumen, a very delicate whey may be prepared from it as from milk.

The bland oil, called Almond oil, is obtained from bitter as well as sweet almonds by expression, if no heat be employed; but if heated, the oil expressed from bitter almonds is impregnated more or less with the narcotic volatile oil, as is readily manifested by its smell and taste.

Sweet almonds are of greater use in food than as medicine, but they are reckoned to afford little nourishment; and when eaten in substance, are not easy of digestion, unless thoroughly comminuted. They are supposed, on account of their unctuous quality, to obtund acrimonious juices in the primæ viæ: peeled sweet almonds, eaten six or eight at a time, sometimes give present relief in the heartburn.

Bitter almonds have been found poisonous to dogs and smaller animals; and a water distilled from them, when made of a certain degree of strength, has had the same effects. The essential oil obtained by distillation is one of the most virulent poisons known. Nevertheless bitter almonds are every day used in cookery, on account of their agreeable flavour; but there are some habits, in which the smallest quantity produces urticaria, and other unpleasant symptoms.

Medical use.—Almond oil is supposed to blunt acrimonious humours, and to soften and relax the solids: hence its use internally, in tickling coughs, heat of urine, pains and inflammations; and externally, in tensions and rigidity of particular parts. On triturating almonds with water, the oil and water unite together, by the mediation of the albuminous matter of the kernel, and form a bland milky liquor, called an Emulsion, which may be given freely in acute or inflammatory disorders. As the bitter almond imparts its peculiar taste when treated in this way, the sweet almonds alone are employed in making emulsions.

Several unctuous and resinous substances, of themselves not miscible with water, may, by trituration with almonds, be easily mixed with it into the form of an emulsion; and are thus excellently fitted for medicinal use. In this form camphor, and the resinous purgatives, may be commodiously taken.

It is a singular fact, that the seeds of two varieties of the same kernel should differ so essentially in their chemical composition; the bitter almonds containing a deleterious principle, which does not exist in the sweet variety, although found in its bark, leaves and flowers; while the sweet contains a muco-saccharine principle, wanting in the bitter.

The existence of *hydrocyanic* or *prussic acid*, as a vegetable principle, was discovered in 1802 by Bohm, in the distilled water of bitter almonds. By repeated cohobation of the same water with fresh quantities of bitter almonds, Von Ittner obtained from six pounds of almonds, one drachm and 40 grains of volatile oil, and two pounds of very concentrated distilled water. The oil was of a golden yellow, heavier than water, and disposed to crystallize. Their smell was pungent, kernelly; and their taste bitter and acrid. Some curious observations in regard to the chemical properties of this oil, have been made by Vogel and Robiquet.

The hydrocyanic acid was discovered in the leaves of the cherry laurel by Schrader, also in 1802; in peach blossoms and leaves by Vauquelin; in cherry water by Von Ittner, and in the bark of the bird cherry by John. In all these and many similar substances, the acid is modified by its intimate combination with a volatile oil.

Laurel water is prepared, according to the Prussian Pharmacopœia, by drawing off three pounds of distilled water from two pounds of the fresh leaves. Thomassen von Thuessink observed it to produce immediately cheerfulness, a lower pulse, and quiet sleep. It has hitherto been chiefly recommended in melancholy with an atrabilious constitution, and in obstructions of the liver with a viscid state of blood.

Peach blossoms are also recommended as an anthelmintic purgative. They are given in infusion; half an ounce of the fresh petals, or a drachm of the dry, for a dose. A syrup is officinal in Wirtemberg.

The *bird-cherry bark* is used in substance against agues, and in decoction against rheumatism, and slight, or residuary, syphilitic affections.

Hydrocyanic acid has recently been much used. It was first tried in Italy by Brera and Borda in hypersthenic diseases, and violent pulmonary inflammations, and in worms. Magendie in Paris recommended it in pulmonary consumptions, and Dr Granville not only quickly made known in this country the continental experiments with hydrocyanic acid, but he has prosecuted the subject with great zeal, and has extended its use to asthma, sympathetic cough, spasmodic cough of pregnant women, acute pain attending abortion, &c. It is prepared by the Apothecaries Company in London, for medical purposes, from cyanuret of mercury ℔. i, hydrochloric acid ℔. i, and water ℔. v. Four pints are drawn off and rectified through chalk; but it has not been admitted into the recent edition of the Pharmacopœia. The French Pharmacopœia prescribes Vauquelin's process, which consists in dissolving one part of cyanuret of mercury in eight parts of water by means of a gentle heat, and transmitting through it a stream of sulphuretted hydrogen until a little remain in excess. The sulphuret of mercury formed is separated by filtration. The filtered liquor is hydrocyanic acid with a little sulphuretted hydrogen, which is easily separated by shaking it with some subcarbonate of lead, and again filtering. Ten drops of this acid may be given in six or eight ounces of any proper vehicle, in the dose of a table spoonful every third hour. I have employed it so rarely that I am not entitled to give any opinion of its effects from my own experience; but it is not well fitted for general use; as besides being dangerous from its activity, it very readily becomes effete from exposure to light, or imperfect preservation. I should be disposed to prefer the distilled water of bitter almonds or cherry laurel water, as being more manageable, and less liable to decomposition.

AMYLUM. *Lond. Ed. Dub.*

Starch from wheat flour.

WHEAT flower consists chiefly of starch, gluten, albumen, and a sweet mucilage. These may be easily separated by forming the flour into a paste with a little water, and washing this paste with fresh quantities of water until it runs from it colourless. What remains is the gluten, which, if not the same with, is very analogous to, the fibrine of animal substances. From the water with which the paste was washed, a white powder, *Amylum*, separates on standing. The albumen and sweet mucilage remain dissolved in the water. By evaporating it, the albumen first separates in white flakes, and the sweet mucilage may be got by total evaporation.

Starch is a fine white powder, generally concreted in friable hexagonal columns, smooth to the feel, and emitting a particular sound when compressed. It has neither taste nor smell. It is decomposed by heat. It is not soluble in cold water or in alcohol. Warm water about 190 F. converts it into a kind of mucilage, which on cooling assumes a gelatinous consistence. This jelly, when dried by heat, becomes transparent and brittle like gum, but is not soluble in cold water. Starch, after being thus dissolved in hot water, cannot be reduced to its original state. It is precipitated by infusion of galls, and the precipitate is redissolved on heating the mixture to 120°, but is not soluble in alcohol. It is the most delicate test of iodin, forming with it a fine blue or violet colour. At 78 F. its watery solution ferments with the addition of yeast. By roasting it becomes soluble in cold water, and it is converted by three or four hours' boiling with sulphuric acid into a saccharine liquid.

It is found in many vegetables combined with different substances:

1. With gluten or fibrin; as in wheat, rye, and other similar seeds.
2. With extractive; as in beans, peas, lupins, &c.
3. With mucilaginous matter; as in the potatoe, and many other roots, in unripe corn.
4. With saccharine matter in beet root, and in corn after it has begun to germinate.
5. With an acrid principle; as in the root of the burdock, jatropha manihot, arum asarum, and other tuberous roots.

In this country starch is manufactured from wheat flour and potatoe; in the West Indies from the jatropha manihot, the well-known arrow root. Starch is not absolutely identical as obtained from different vegetables. M. Planche found that the specific gravity of flour starch to potatoe starch was as 62 to 84; and this difference was not unimportant in Pharmacy, as the former serves admirably to suspend camphor, and the latter is unfit.

Medical use.—As a constituent of many vegetable substances, it forms a most important alimentary substance. In a medical point of view, it is to be considered as a demulcent; and accordingly, it forms the principal ingredient of an officinal lozenge, and a mucilage prepared from it often produces excellent effects, both taken by the mouth, and in the form of a clyster in dysentery, and diarrhœa from irritation of the intestines. Externally flour or starch is the usual application in erysipelatous affections of the skin, but upon what principle is not very apparent, unless it be an empirical practice remaining from the pathology which dreaded the repulsion of all external inflammations.

AMYRIS.

Willd. *g.* 755. *Octandria Monogynia.*—Nat. ord. *Dumosæ,* Linn., *Terbinthaceæ,* Juss.

Sp. 2. AMYRIS ELEMIFERA. *Lond. Dub.*

Elemi.

Off.—The resin called Elemi.

ELEMI. Resina. *Lond. Dub.*

ELEMI was originally brought from Egypt or Ethiopia in masses of two or three pounds wrapped up in palm leaves. This kind is now rare, and it is chiefly imported from the warm provinces of America in tin cases, in large masses, which are afterwards divided, and the pieces wrapped up in parchment. This variety is softer than the other, and has a mixed odour of lemon and camphor. Its taste is strong and acrid.

The tree which furnishes this elemi grows in Carolina and Spanish America. In dry weather, and especially at full moon, incisions are made in the bark, from which a resinous juice flows, and is left to harden in the sun. Dr Wright says, that on wounding the bursera gummifera, a thick milky liquor flows, which soon concretes into a resin exactly resembling the elemi of the shops.

American elemi has been analyzed by M. Bonastre, who found it to contain 60 parts of a transparent resin soluble in alcohol at 60°; 24 of a resinoid substance soluble in boiling alcohol, and deposited on cooling, white and opaque, and incapable of forming a soap with caustic ley; 12.5 parts of volatile oil; 2 of bitter extractive, and 1.5 of acid and impurities. This may be given as an example of the analysis of native resins in general.

Sp. 18. AMYRIS ZEYLANDICA.

A kind of elemi which comes from the East Indies is said to be the produce of this species.

Sp. 6. AMYRIS GILEADENSIS.

Off.—Balsam of Gilead. A liquid resin.

AMYRIDIS GILEADENSIS RESINA. *Edin.*

THIS substance, which has also had the name of Balsamum Judaicum, Syriacum, de Mecca, Opobalsamum, &c. is a resinous juice, obtained from an evergreen tree, growing spontaneously, particularly on the Asiatic side of the Red Sea, near Mecca. The true opobalsamum, according to Alpinus, is at first turbid and white, of a very strong pungent smell, like that of turpentine, but much sweeter; and of a bitter, acrid, astringent taste: upon being kept for some time, it becomes thin, limpid, of a greenish hue, then of a golden yellow, and at length of the colour of honey.

This balsam is in high esteem among the eastern nations, both as a medicine, and as an odoriferous unguent and cosmetic. But in Europe it is never obtained genuine; and as all the signs of its goodness are fallacious, it has been very rarely employed. Nor need we regret it; for any of the other resinous fluids, such as the balsam of Canada or Copaiba, will answer every purpose full as well.

The dried berries of this tree were formerly kept under the title of Carpo-balsamum, and the dried twigs under that of Xylo-balsamum. Although Willdenow has inserted the amyris opobalsamum as a distinct species, he thinks they are the same.

ANCHUSA TINCTORIA. *Ed. Dub.*

Willd. *g.* 277. *sp.* 7. *Pentandria Monogynia.*—Nat. ord. *Asperifoliæ*, Linn., *Borragineæ*, Juss.

Alkanet, or false alkanet.

Off.—The root.

ANCHUSÆ TINCTORIÆ RADIX. *Ed.*

ANCHUSÆ RADIX. *Dub.*

THIS plant is a native of Europe: it is sometimes cultivated in our gardens; but the greatest quantities are raised in France and Germany, particularly about Montpelier and in Silesia, from whence the dried roots are usually imported to us. The alkanet root produced in England is much inferior in colour to that brought from abroad.

Alkanet root has little or no smell; when recent, it has a bitterish astringent taste, but when dried scarcely any. Its chief use is for colouring oils, ointments and plasters. As the colour is confined to the cortical part, the small roots are best, having proportionally more bark than the large.

Alkanet root has been analyzed by Mr John of Berlin. The colouring power resides in a peculiar substance, soluble in alcohol, ether and oils, and not soluble in water; distinguished from the resins by not being fusible, and not being precipitated by water from its solution in alcohol. The tincture by evaporation changes from carmine red to blue, and then to greenish, and the dry extract has an indigo blue colour. Acids heighten the red colour of the tincture, and alkalies change it to blue, which is restored to the original colour by acids. The bark yields only about 5.50 *per cent.* of this substance, which John calls *Pseudo-alcannin,* to distinguish it from the unexamined colouring matter of the real alkanet which is furnished by the Lawsonia inermis, a native of India, Syria and Egypt.

ANETHUM.

Willd. *g.* 560. Smith, *g.* 151. *Pentandria Digynia.*—Nat. ord. *Umbellatæ,* Linn., *Umbelliferæ,* Juss.

Willd. *sp.* 1. ANETHUM GRAVEOLENS. *Lond.*

Dill.

Off.—The seed.

ANETHI SEMINA. *Lond.*

DILL is an annual umbelliferous plant, cultivated in gardens, as well for culinary as medical use. The seeds are of a pale yellowish colour, in shape nearly oval, convex on one side, and flat on the other. Their taste is moderately warm and pungent; their smell aromatic, but not of the most agreeable kind. The seeds are recommended as carminative in flatulent colics.

Willd. *sp.* 3. Smith, *sp.* 1. ANETHUM FŒNICULUM. *Ed. Lond. Dub.*

Sweet Fennel.

Off.—The seeds.

a) ANETHI FŒNICULI SEMINA. *Ed.*
FŒNICULI DULCIS SEMINA. *Dub.*
FŒNICULI SEMINA. *Lond.*

THIS is a biennial plant, of which there are four varieties. One of these, the common fennel, is indigenous on chalky cliffs. The sweet fennel, the variety, which is officinal, grows wild in Italy, but is also cultivated in our gardens. It is smaller in all its parts than the common, except the seeds, which are considerably larger.

The seeds of both fennels have an aromatic smell, and a moderately warm pungent taste: those of the *fœniculum dulce* are in flavour most agreeable, and have also a considerable degree of sweetness.

From 960 parts, Neumann obtained 20 of volatile oil, by alcohol, 84 resinous extract, 120 fixed oil, and then by water 129 of a bitter extract.

Medical use.—Carminative.

ANGELICA ARCHANGELICA. *Ed.*

Willd. *g.* 543, *sp.* 1.—Smith, *g.* 138. *sp.* 1.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Angelica.

Off.—The root.

ANGELICÆ ARCHANGELICÆ RADIX. *Ed.*

ANGELICA is a large biennial umbelliferous plant. It grows spontaneously on the banks of rivers in alpine countries. It has been found wild in England, but it is doubtful whether it be indigenous. For the use of the shops it is cultivated in gardens.

All the parts of angelica, especially the roots, have a fragrant aromatic smell, and a pleasant bitterish warm taste, glowing upon the lips and palate for some time after they have been chewed. The fresh root, wounded early in the spring, is said to yield an odorous yellow juice, which slowly exsiccated, proves a gum-resin, very rich in the virtues of the angelica. On drying the root, this juice concretes into distinct molecules, which, on cutting it longitudinally, appear distributed in little veins. Angelica roots are apt to grow mouldly, and to be preyed on by insects. Baumé says, that it is only the roots gathered in the spring that are subject to this inconvenience, and that when gathered in the autumn they keep good several years.

John analyzed the dried angelica root, and proved that it owes its peculiar properties to a considerable proportion of essential oil, and acrid resin; but it also contains much gum and some inulin.

Angelica is one of the most elegant aromatics of European growth, though little regarded in the present practice. The root, which is the most efficacious part, is used in the aromatic tincture. The candied stalks make an agreeable sweetmeat, which is frequently presented in deserts to promote digestion.

ANGUSTURA CORTEX. *Dub.* See BONPLANDIA.

ANISI SEMINA. *Dub. Lond.* See PIMPINELLA.

ANTHEMIS.

Willd. *g.* 1517, Smith, *g.* 376. *Syngenesia Polygamia Superflua.*—Nat. ord. *Compositæ Radiatæ*, Linn., *Synathereæ*, sect. *Corymbiferæ*, Juss.

Willd. *sp.* 15, Smith, *sp.* 1. ANTHEMIS NOBILIS. *Ed. Lond. Dub.*

Chamomile.

Off.—The flowers.

ANTHEMIDIS NOBILIS FLORES. *Ed.*
ANTHEMIDIS FLORES. Flores simplices. *Lond.*
FLORES CHAMÆMELI. *Dub.*

CHAMOMILE is a perennial plant, indigenous in the south of England, but cultivated in our gardens for the purposes of medicine. The flowers have a strong, but ungrateful, aromatic smell, and a very bitter nauseous taste. The flowers of the common feverfew, *Matricaria chamomilla,* have similar properties.

Their active constituents are bitter extractive, and essential oil. To the latter is to be ascribed their antispasmodic, carminative, cordial, and diaphoretic effects; to the former, their influence in promoting digestion.

Neumann obtained from 480 parts, 180 of alcoholic extract, and afterwards 120 of watery; and reversing the procedure, 240 of watery, and 60 alcoholic.

Med. use.—Chamomile flowers are a very common and excellent remedy, which is often used with advantage in spasmodic diseases, in hysteria, in spasmodic and flatulent colics, in suppression of the menstrual discharge, in the vomiting of puerperal women, in the afterpains, in gout, in podagra, intermittents, and in typhus.

Chamomile is also capable of exciting vomiting, especially when given in warm infusion; and in this way it is often used to assist the action of other emetics.

Externally, chamomile flowers are applied as a discutient and emollient, in the form of glyster or embrocation, in colic, dysentery and strangulated hernia, &c.

Chamomile flowers are exhibited,

1. In substance, in the form of powder, or rather of electuary, in doses of from half a drachm to two drachms, either alone, or combined with Peruvian bark, as for the cure of intermittent fevers.

2. In infusion, in the form of tea. This may either be drunk warm, for promoting the action of emetics, or cold, as a stomachic.

3. In decoction or extract. These forms contain only the extractive, and therefore may be considered as simple bitters.

4. The essential oil may be obtained by distillation. This possesses the antispasmodic powers in a higher degree than the simple flowers, but, on the contrary, does not possess the virtues depending on the presence of the bitter extractive.

Sp. ANTHEMIS PYRETHRUM. *Ed. Lond. Dub.*
Pellitory of Spain.
Off.—The root.
RADIX ANTHEMIDIS PYRETHRI. *Edin.*
RADIX PYRETHRI. *Dub. Lond.*

THIS plant, though a native of warm climates, as Barbary, bears the ordinary winters of this country, and often flowers successively from Christmas to May. The roots also grow larger with us than those with which the shops are usually supplied from abroad. They are seldom so big as the little finger, and the best are dry, compact, of a brown colour, and not easily cut with a knife.

Pellitory root has no sensible smell; its taste is very peculiar, exciting a mixed sensation of coldness and acrimony succeeded by a great flow of saliva and durable tremulous pulsations in the tongue and other soft parts which it touches, but in a less degree than arum root; the juice expressed from it has scarcely any acrimony, nor is the root itself so pungent when fresh, as after it has been dried. Neumann obtained from 960 parts of the dry root only 40 of alcoholic extract, which was excessively pungent. Its acrimony, therefore, is derived from a resin. John found that the greater part of the watery extract consisted of inulin.

Medical use.—The principal use of pellitory root is for promoting the salival flux, as a masticatory; by this means it often relieves the toothach, some kinds of pains in the head, and lethargic complaints. A saturated tincture is the nostrum of some dentists. A vinous infusion is also useful in debility of the tongue.

ANTIMONIUM. *Stibium.*
Antimony.
Antimony is found,

I. In its metallic state, at Sala in Sweden, Allemont in France, and Andreasberg in the Harz.
II. Mineralized with sulphur.
  1. Grey antimony.
    a. Compact;
    b. Foliated;
    c. Radiated;
    d. Plumose.
  2. Nickeliferous.

III. Oxidized.
1. White ore—Bohemia, Dauphiny.
2. Ochre—Freyberg.
3. Red ore—Saxony, Hungary, Allemont.

The grey ore of antimony is the state in which it is officinal, and also that in which it is most commonly found.

ANTIMONII SULPHURETUM. *Ed. Dub. Lond.*

Sulphuret of antimony.

ANTIMONY is obtained from its ores by gradually detonating in a large crucible four parts of sulphuretted antimony, three of crude tartar, and one and a half of nitrate of potash, reduced to a fine powder, and intimately mixed. The detonated mass is then to be fused, and poured into a heated mould, greased with a little fat, in which it is allowed to consolidate. It is then turned out, and the scoriæ are separated from the antimony, which will weigh about one-fourth part of the sulphuret employed. The scoriæ are a mixture of sulphuret of potass and of antimony, and may be preserved for other purposes.

Another method of obtaining antimony is by melting three parts of sulphuretted antimony with one of iron. The sulphur combines with the iron, and forms a scoria above the antimony, which melts and occupies the lower part of the crucible.

Metallic antimony is white, very brilliant, lamellated; specific gravity 6.702; moderately hard; pulverizable; fusible at 809; volatile when highly ignited; sensible taste and smell; unalterable in cold air; oxidizable by air and heat; oxide fusible into a yellow-brown glass; decomposes water when ignited; oxidized by the sulphuric and nitric acids; combines with phosphorus and sulphur. Oxides colour glass yellow and hyacinthine.

Medical use.—Formerly metallic antimony was given internally; but as its action depended entirely on the acid which it met with in the stomach, its effects were very uncertain and often violent. Cups were also made of antimony, which imparted to wine that stood in them, for some time, an emetic quality. But both these improper modes of exhibiting this metal are now laid aside.

Although sulphuretted antimony be a natural production, yet it is commonly sold in the form of loaves, which have been separated from the stony, and other impurities of the ore, by fusion, and a species of filtration. The ore is melted in conical well-baked earthen pots, having one or more small holes in their apices. The fire is applied round and above these pots; and as soon as the sulphuretted antimony melts, it drops through the holes into vessels placed beneath to receive it, while the stony and other impurities remain behind. As antimony is volatile, the mouths and joinings of the pots must be closed and luted. The upper part of the loaves thus obtained is more spongy, lighter and impure, than the lower, which is therefore always to be preferred. These loaves have a dark-grey colour externally, but on being broken they appear to be composed of radiated striæ, of a metallic lustre, having the colour of lead. The goodness of the loaves is estimated from their compactness and weight, from the largeness and distinctness of the striæ, and from their being entirely vaporizable by heat. Lead has been sold for antimony; but its texture is rather foliated than striated, and it is not vaporizable. The presence of arsenic, which renders the antimony unfit for medical purposes, is known by its emitting the smell of garlic when thrown upon live coals, and by other tests mentioned under arsenic. The presence of manganese or iron is known by their not being volatilized by a red heat.

Sulphuretted antimony was employed by the ancients, in collyria, against inflammations of the eyes, and for staining the eye-brows black. Its internal use does not seem to have been established till towards the end of the fifteenth century; and even at that time it was by many looked upon as poisonous. But experience has now fully evinced, that it may be administered with perfect safety, being often used, particularly in chronic eruptions; that some of the preparations of it are medicines of great efficacy.

Off. Prep.—Antimony is at present the basis of many officinal preparations, to be afterwards mentioned. But besides those still retained, many others have been formerly in use, and are still employed by different practitioners. The following table, drawn up by Dr Black, exhibits a distinct view of the whole, with the officinal names at that time.

DR BLACK'S TABLE OF THE PREPARATIONS OF ANTIMONY.

Medicines are prepared either from crude antimony, or from the pure metallic part of it called regulus.

From Crude Antimony.

I. By trituration.
Antimonium præparatum. Lond.

II. By the action of heat and air.
Flores antimonii sine addito.
Vitrum antimonii. Ed.
Antimonium vitrificatum. Lond.
Vinum antimonii ceratum. Ed.

III. By the action of alkalies.
Hepar antimonii mitissimum.
Regulus antimonii medicinalis.
Hepar ad Kermes minerale. *Geoffroi.*
Hepar ad tinct. antimonii.
Kermes minerale.
Sulphur antimonii præcipitatum. Ed. et Lond.

IV. By the action of nitre.
Crocus antim. mitissimus, *vulgo Regulus antim. medicinalis.*
Crocus antimonii. Ed. et Lond.
Antimonii emeticum mitius. Boerh.
Antim. ustum cum nitro, *vulgo* Calx antimonii nitrata. Ed.
Antimonium calcinatum. Lond. *Vulgo Antimonium diaphoret.*
Antim. calcareo-phosphoratum, sive pulvis antimonialis. Ed.
Pulvis antimonialis. Lond.

V. By the action of acids.
Antim. vitriolat. Klaunig.
Antim. cathartic. Wilson.
Antimonium muriatum, *vulgo* Butyrum antim. Ed.
Antimonium muriatum. Lond.
Pulvis algarothi, sive *Mercurius Vitæ.*
Bezoardicum minerale.
Antimonium tartarisatum, *vulgo* Tartarus emeticus. Ed.
Antimonium tartarisatum. Lond.
Vinum antimonii tartarisati. Ed. et Lond.
Vinum antimonii. Lond.

From the Regulus.

This metal, separated from the sulphur by different processes, is called *Regulus antimonii simplex*, *Regulus martialis*, *Regulus jovialis*, &c. From it were prepared,

I. By the action of heat and air,
Flores argentei, sive nix antimonii.

II. By the action of nitre,
Cerussa antimonii.
Stomachicum Poterii.
Antihecticum Poterii.
Cardiacum Poterii.

PREPARATIONS, which have their name from ANTIMONY, but scarcely contain any of it.

Cinnabaris antimonii.
Tinctura antimonii.

To this table of Dr Black's, which is left unaltered, I shall add another, of the officinal preparations, not taken from the mode of preparation, but from the nature of the product.

ANTIMONY is exhibited,

I. In its metallic state,
  Combined with sulphur.
    Sulphuretum antimonii. *E. D. L.*
    ——————— præparatum. *E. D.*
II. Oxidized.
  a. Protoxide combined with sulphur,
    1. Sulphuretum antimonii præcipitatum. *E. L.*
    2. Sulphur antimoniatum fuscum. *D.*
    3. Antimonii vitrum. *L.*
  b. Protoxide combined with muriatic acid,
    Oxidum antimonii nitro-muriaticum. *D.*
  c. Protoxide combined with tartaric acid and potass,
    Tartras antimonii. *E.*
    Antimonium tartarisatum. *L.*
    Tartarum antimoniatum, sive emeticum. *D.*
    Dissolved in wine, Vinum tartratis antimonii. *E.*
    Dissolved in diluted alcohol, Vinum antimonii tartarisati. *L.*
  d. Protoxide combined with phosphate of lime,
    Oxidum antimonii cum phosphate calcis. *E.*
    Pulvis antimonialis. *L. D.*

THESE are the present officinal preparations of antimony. In estimating their comparative value, we may attend to the following observations. All the metallic preparations are uncertain, as it entirely depends on the state of the stomach, whether they act at all, or operate with dangerous violence. The sulphuret is exposed, though in a less degree, to the same objections.

The preparations in which antimony is in the state of peroxide, are perfectly insoluble in any vegetable or animal acid, and are also found to be inert when taken into the stomach.

The remaining preparations of antimony, or those in which it is in the state of protoxide, are readily soluble in he juices of the stomach, and act in very minute doses. Of ts saline preparations, only those can be used internally which contain a vegetable acid; for its soluble combinations with the simple acids are very acrid and corrosive. In general, the surest and best preparations of antimony are those which contain a known quantity of the metal in its state of protoxide.

The general effects of antimonials are, in small doses, diaphoresis, nausea; in large doses, full vomiting and purging. Some allege that antimonials are of most use in fevers when they do not produce any sensible evacuation, as is said to be the case sometimes with James's powder. They therefore prefer it in typhus, and emetic tartar in synochus, in which there is the appearance at first of more activity in the system, and more apparent cause for evacuation.

ANTIMONII VITRUM, S. S. Antimonii oxydum sulphuratum vitrificatum. *Lond.*

THE sulphuretted oxide of antimony vitrified, commonly called Glass of Antimony.

The glass of antimony, which in the older editions of our Pharmacopœias was among the officinal preparations, and then rejected altogether, is now restored by the London College 1824, but inserted among the materia medica, as an article to be purchased, not prepared. The manner of preparing it was thus set down in the Edinburgh Pharmacopœia 1805.

Strew sulphuret of antimony, beat into a coarse powder, like sand, upon a shallow, unglazed, earthen vessel, and apply a gentle heat underneath, that the antimony may be heated slowly: stirring it, at the same time, continually, to prevent it from running into lumps. White vapours, of a sulphureous smell, will arise from it. When they cease with the degree of heat first applied, increase the fire a little, so that vapours may again arise; go on in this manner, till the powder, when brought to a red heat, exhales no more vapour. Melt this powder in a crucible, with an intense heat, till it assumes the appearance of melted glass; then pour it out on a heated brass plate.

In the first part of this process great part of the sulphur is driven off, while the antimony is converted into protoxide. In this state it was formerly called Antimonial Ash, *Cinis Antimonii.* In the second part this ash is melted. Mr Phillips seems to consider the presence of silex derived from the crucible as necessary for the vitrification, and in fact the glass of antimony always contains a notable proportion of silex, generally more than 5 *per cent.*

When properly prepared, it is in thin plates broken into fragments, having a metallic steel grey lustre, but tolerably transparent, and of a garnet, hyacinthine or orange red viewed by transmitted light. It is hard and rings, and is brittle, easily reduced to a brown powder. It is insoluble in water, but soluble in acids and in cream of tartar; the weak acids leaving red flocculi, like *Kermes mineral*, undissolved.

It may be impure from containing too much silica or oxide of iron; and glass of lead may be sold for it. But it it known to be good, if it is capable of being dissolved, with the exception of a few red flocculi, when digested in strong muriatic acid. The presence of an excess of silica is known by a gelatinous or sandy residuum; of iron by the dark colour of the solution, and its precipitation by the ferroprussiate of potass; and lead is detected by its forming shining crystalline flakes, which, when dissolved in distilled water, give a white precipitate with sulphuric acid. The substitution of glass of lead is also detected when it is boiled in a solution of cream of tartar, in order to make tartar emetic; by scarcely any of it being dissolved, and by its being soon rendered black, according to Mr Phillips.

Medical use.—Glass of animony is a very active preparation of antimony, but unequal in its effects, and therefore unfit for internal exhibition.

Pharmaceutical use.—It is employed for the preparation of tartar emetic, for which it has been long recommended, and particularly by the late Dr Murray, as the fittest of the antimonial oxides.

AQUA.
Water.

Water does not enter the list of materia medica of any of the Colleges; but it is so important an agent, both in the cure of diseases, and in the practice of pharmacy, that a brief account of its varieties and properties can scarcely be considered as superfluous.

Water consists of hydrogen combined with oxygen, in the proportion of 1.25 to 10., or $88.\dot{8}$ and $11.\dot{1}$ *per cent.* by weight, and is formed by the combination of two volumes of hydrogen with one of oxygen. Water is transparent, colourless, inodorous, and insipid. As water is assumed as the standard, or unity, in all tables of specific gravity of fluids and solids, it is necessary to know that a cubic inch of it weighs, at 30 inches barometer, and 60° thermometer, 253.724 grains. At 30° it exists in a solid form, and is crystallized. At 212° it expands to 1700 or 1800 times its bulk, and is converted into a very elastic transparent and colourless vapour. Water absorbs small quantities of the simple gases, especially oxygen. It dissolves several of the salifiable bases, and in some degree all saline bodies, and is essential to the crystallization of most of them. It is composed and decomposed in many instances, and its chemical agency is almost universal.

Water should be perfectly transparent, and have neither smell nor taste, but it is never found perfectly pure; and sometimes it is unfit for the use of man. *Atmospheric water* comprehends snow and rain water. When collected in the open fields, it is the purest natural water: that which falls in towns, or is collected from the roofs of houses, is contaminated with soot, animal effluvia, and other impurities, although after it has rained for some time, the quantity of these diminishes so much, that Morveau says that it may be rendered almost perfectly pure by means of a little barytic water, and exposure to the atmosphere. Snow water is supposed to be unwholesome, but it is not very apparent upon what principle. Atmospheric water, after it falls, either remains on the surface of the earth, or penetrates through it until it meet with some impenetrable obstruction to its progress, when it bursts out at some lower part, forming a spring or well. The water on the surface of the earth, either descends along its declivities in streams, which gradually wearing channels for themselves, combine to form rivers, which at last reach the sea, or remain stagnant in cavities of considerable depth, forming lakes or ponds, or on nearly level ground, forming marshes.

The varieties of spring water are exceedingly numerous; but they may be divided into the soft, which are sufficiently pure to dissolve soap, and to answer the purposes of pure water in general; the hard, which contain earthy salts and decompose soap, and are unfit for many purposes, both in domestic economy and in manufactures; and the saline, which are strongly impregnated with soluble salts. When spring waters possess any peculiar character, they are called mineral waters. The purest springs are those which occur in primitive rocks, or in beds of gravel, or filter through siliceous strata. In general, large springs are purer than small ones. Wells are in fact artificial springs, and are more impure, as the soil which forms their filter contains more soluble matter. Hence old wells contain finer water than new ones, as the soluble particles are gradually washed away.

River water is in general soft, as it is formed of spring water, which by exposure becomes more pure, and of running surface water, which, although turbid, from particles of clay suspended in it, is otherwise very pure. It is purest when it runs over a rocky soil, and its course is rapid, and it is well adapted for the brewing of malt liquor, and other purposes which require great solvent power. Lake water is similar to river water. The water of marshes, on the contrary, is exceedingly impure, and often highly fetid, from the great proportion of animal and vegetable matters which are constantly decaying in them.

Mineral waters derive their peculiarity of character, in general, either from containing carbonic acid, or soda, not neutralized, sulphuretted hydrogen, purging salts, earthy salts, or iron; or from their temperature exceeding in a greater or less degree that of the atmosphere. The following are the most celebrated.

a. Warm springs.—Bath, Bristol, Buxton, Matlock, in England. Barege, Vichy, &c. in France. Aix-la-Chapelle, Borset, Baden, Carlsbad, and Toeplitz in Germany; and Pisa, Lucca, Baia, and many others, in Italy.
b. Carbonated springs.—Pyrmont, Seltzer, Spa, Cheltenham, Scarborough.
c. Alkaline.—Carlsbad, Aix-la-Chapelle, Barege, Toeplitz.
d. Sulphureous.—Enghien, Lu, Aix-la-Chapelle, Kilburn, Harrowgate, Moffat, and many in Italy.
e. Purging.—Sea water, Lemington Priors, Harrowgate, Lu, Carlsbad, Moffat, Pitcaithly, Toeplitz, Epsom, Seidlitz, Kilburn, and all brackish waters.
f. Calcareous.—Matlock, Buxton, and all hard waters.
g. Chalybeate.—Hartfell near Moffat, Peterhead, Denmark, Cheltenham, Pyrmont, Spa, Tunbridge, Bath, Scarborough, Vichy, Carlsbad, Lemington Priors.

In the early editions of this Dispensatory, I gave a table of the contents of some of the mineral waters which had been most accurately analyzed, but I afterwards omitted it on account of the great multiplication of these analyses, so that whole volumes have been written on the subject; and also of the great discrepancy of the analysis of each by different chemists, so that it was not possible to reconcile them. This arises partly from the mode of analysis, which determines the acids and alkalis to unite differently. Indeed, it is doubtful whether in the water itself there exists any secondary compounds, or whether the whole bases and acids form one saline compound, and therefore it appears to me to be better to indicate the quantity of each acid and base by itself, and not as combined into neutral salt. M. Döbereiner has endeavoured to shew, that the saline ingredients of mineral waters exist in determinate proportions according to the atomic doctrine; and his doctrine would be very convenient, as enabling us to select amongst the variety of discrepant analyses. It is singular that mineral waters of an opposite nature, especially sulphureous and chalybeate, almost always exist in the neighbourhood of each other. This, Professor Reuss thinks, depends upon a subterranean galvanic action, by which the negative and positive electric principles are separated by polarity.

Medical use.—Water is an essential constituent in the organization of all living bodies; and as it is continually expended during the process of life, that waste must be also continually supplied; and this supply is of such importance, that it is not left to reason or to chance, but forms the object of an imperious appetite. When taken into the stomach, water acts by its temperature, its bulk, and the quantity absorbed by the lacteals. Water about 60° gives no sensation of heat or cold; between 60° and 45° it gives a sensation of cold, followed by a glow and increase of appetite and vigour; below 45° the sensation of cold is permanent and unpleasant, and it acts as an astringent and sedative; above 60° it excites nausea and vomiting, probably by partially relaxing the fibres of the stomach, for, when mixed with stimulating substances, it has not these effects. In the stomach and in the intestines it acts also by its bulk, producing the effects arising from the distention of these organs; and as the intestinal gases consist of hydrogen gas, either pure or carburetted, sulphuretted or phosphuretted, it is probably in part decomposed in them. It likewise dilutes the contents of the stomach and intestines, thus often diminishing their acrimony. It is absorbed by the lacteals, dilutes the chyle and the blood, increases their fluidity, lessens their acrimony, and produces *plethora ad molem.* Its effects in producing plethora and fluidity of the blood are however very transitory, as it at the same time increases the secretion by the skin and kidneys. Indeed, the effects of sudorifics and diuretics depend, in a great measure, on the quantity of water taken along with them.

Mineral waters have also a specific action depending on the foreign substances which they contain. It is however necessary to remark, that their effects are in general much greater than might be expected from the strength of their impregnations, owing, probably, to the very circumstance of their great dilution, by which every particle is presented in a state of activity, while the lacteals admit them more readily than they would in a less diluted state.

Carbonic acid gas gives to the waters which are strongly impregnated with it a sparkling appearance, and an agreeable degree of pungency. In its effects on the body it is decidedly stimulant, and even capable of producing a certain degree of transient intoxication. It is of great service in bilious complaints, atony of the stomach, nausea, and vomiting, and in all fevers of the typhoid type.

Alkaline waters produce also a tonic effect on the stomach, but they are less grateful. They are particularly serviceable in morbid acidity of the stomach, and in diseases of the urinary organs. Alkaline waters are often supersaturated with carbonic acid, which renders them more grateful and stimulating in the first instance, but ultimately they act as alkalies.

Sulphureous waters are chiefly used in cutaneous and glandular diseases. Their effects are stimulant and heating, and they operate by the skin or bowels.

Purging waters derive their effects from the neutral salts they contain, especially the muriates of soda, lime, and magnesia, and the sulphates of soda and magnesia. They are much more frequently used for a length of time to keep the bowels open by exciting the natural action, than to produce full purging. Used in this way, instead of debilitating the patient, they increase his appetite, health, and strength.

Chalybeate waters are used as tonics. They stimulate considerably, and increase the circulation; but as they also generally contain neutral salts, they act as gentle laxatives. They are used in all cases of debility, cachexia, chlorosis, fluor albus, amenorrhœa, and in general in what are called nervous diseases.

The external use of water depends almost entirely on its temperature, which may be,

1. Greater than that of the body,
    a. As in the state of vapour. The vapour bath.
    b. Above 97° F. The hot bath.
2. Below the temperature of the body.

a. From 97 to 85, the warm bath.
b. From 85 to 65, the tepid bath.
c. From 65 to 32, the cold bath.

The vapour bath is a popular remedy in many countries, both in the most civilized and rudest state of society. Some rude nations cure many diseases by throwing water on heated stones, and exposing the patients to the vapour produced. The vapour baths of the Russians have been described by every one who has published his travels in that country. The vapour is often heated in them as high as 150° Fahr.; in which the Russians remain for hours. They do not, however, expose themselves at once to so high a temperature. When they enter, they are obliged to remain some time with their heads bent towards the ground, and then to sit at first on the lower steps, with which the bath is surrounded in the manner of an amphitheatre. As they ascend to the higher and hotter stages, they throw a little cold water, they take with them, over their neck and shoulders. From the bath they repeatedly run out with their skin as red as scarlet, and roll themselves in the snow, or plunge into the coldest water they can find, with delight and impunity. They then dry and dress themselves, and go home wrapt up in their pellices.

The modern Egyptians also make great use of the vapour-bath; but their arrangement is considerably different, and the temperature seldom carried higher than 110° F.

Celsus and Aretæus may be consulted for the use of the vapour-bath among the ancients.

The use of the vapour-bath, chiefly, however, medicated, has been very generally introduced into France by MM. Gales and Darcet, into Germany by De Carro, and into Italy by Assalini; and in my own practice, I have seen scaly cutaneous diseases, which had resisted for years every other treatment, yield in a short time to the use of the vapour-bath. Its action in relaxing stiff joints is also striking. Its immediate effects are to accelerate the circulation, and to excite profuse sweating. In general the vapour of water alone is sufficient, but more frequently it is medicated with the vapours of different kinds. The following are Assalini's indications for their use:

1. To excite the cutaneous system, restore the transpiration, and promote sweat. 2. To soften the cutaneous texture, and relax some parts affected with inflammation. 3. To allay increased sensibility of the nervous system. 4. To

promote the eruption of exanthematous and herpetic (?) diseases, and to derive gouty or morbid humours from the noble organs to those less essential to life. 5. To combat organic skin diseases of an herpetic or scabious nature, and tinea itself. 6. To shorten the cure of syphilis. 7. To cause the re-absorption of lymph arrested in the lymphatic glands, and in the cellular tissu of the joints. 8. To restore the action and lost tone of the mucous membranes. 9. To revive muscular action and that of the organs of digestion. 10. To promote the cicatrization of chronic ulcers.

The hot bath is decidedly stimulant in its action. It renders the pulse frequent, the veins turgid, the skin red, the face flushed, the respiration quick, increases animal heat, and produces sweat. If the temperature be very high, the face becomes bathed in sweat, the arteries at the neck and temples beat with violence, anxiety and a sense of suffocation are induced, and, if persisted in, vertigo, throbbing in the head, and apoplexy, are the consequences. It is very rarely employed in medicine, except where there are hot springs, as at Baden in Switzerland. The Russians, and some other nations, use the hot bath as an article of luxury.

The effects of the affusion of hot water have not been ascertained, although employed as a luxury in some places in India; and it is probable that when the heat is not so great as to destroy the organization of the skin, the very transient application of the water would be more than counteracted by the subsequent evaporation.

With regard to the action arising from their temperature, all baths below 97° differ only in degree, as they all ultimately abstract caloric from the surface, but with a force inversely as their temperature.

The warm bath excites the sensation of warmth, partly because our sensations are merely relative, and partly because its temperature, though less than that of the internal parts of the body, is actually greater than that of the extremities, which are the chief organs of touch. The warm bath diminishes the frequency of the pulse, especially when it has been previously greater than natural, and this effect is always in proportion to the time of immersion. It also renders the respiration slower, and lessens the temperature of the body, relaxes the muscular fibre, increases the bulk of the fluids by absorption, removes impurities from the surface, promotes the desquamation and renewal of the cuticle, and softens the nails, and indurations of the skin.

The stimulant power of the warm bath is therefore not very considerable, and its employment in disease will be chiefly indicated by preternatural heat of the surface and frequency of the pulse, rigidity of the muscular fibre, and morbid affections of the skin. It has accordingly been found serviceable in many cases of pyrexia, both febrile and exanthematous, in many spasmodic diseases, and in most of the impetigines. It is contra-indicated by difficulty of breathing, and internal organic affections, and should not be used when the stomach is full.

The affusion of warm water very generally produces a considerable diminution of heat, a diminished frequency of pulse and respiration, and a tendency to repose and sleep; but its effects are not very permanent, and its stimulus is weak. It is recommended in febrile diseases depending on the stimulus of preternatural heat, and in those attended with laborious respiration, and in the paroxysms of hectic fever.

As the tepid bath and affusion produce effects intermediate between those of warm and cold water, it is unnecessary to enumerate them.

The cold bath produces the sensation of cold, which gradually ceases, and is succeeded by numbness. It excites tremors in the skin and shivering. The skin becomes pale, contracted, and acquires the appearance termed *Cutis Anserina.* The fluids are diminished in volume, the solids are contracted, the caliber of the vessels is lessened, and therefore numbness and paleness are induced, and the visible cutaneous veins become smaller. There is a sense of drowsiness and inactivity, the joints become rigid and inflexible, and the limbs are affected with pains and spasmodic contractions. The respiration is rendered quick and irregular, the pulse slow, firm, regular and small; the internal heat is at first diminished, but gradually and irregularly returns nearly to its natural standard; the extremities, however, continue cold and numb, or swollen and livid; the perspiration is suppressed, and the discharge of urine is rendered more frequent and copious. If the cold be excessive on its application, long continued violent shiverings are induced, the pulse ceases at the wrist, the motion of the heart becomes feeble and languid, there is a sensation of coldness and faintness at the stomach, and a rapid diminution of animal heat; and at last delirium, torpor and death are the consequences. If the application of the cold bath be not carried to an excessive length, on emerging from the water, the whole body is pervaded by an agreeable sensation of warmth, and the patient feels refreshed and invigorated.

The primary action of the cold bath is stimulant, and the degree of this action is in proportion to the lowness of its temperature. This opinion is indeed directly opposite to a theory of cold which has been advanced with the confidence of demonstration. But, in fact, the action of cold is by no means simple. It is complicated, and varies according to its intensity, duration, and the state of the system to which it is applied. It acts at first as a stimulant, in exciting sensation; then as a tonic in condensing the living fibre; and, lastly, however paradoxical it may appear, as a sedative, by preventing that distribution of blood in the minute and ultimate vessels, which is necessary for the existence of sensibility and irritability, and by the abstraction of the stimulus of heat.

The cold bath may be therefore so managed as to procure any of these effects by regulating the length of time for which it is applied.

Cold affusion, or the pouring of cold water over the body, is a very convenient way of applying the cold bath in many cases. In this way cold is very suddenly applied to the surface, its operation is instantaneous and momentary, but by repeated affusions, its extreme effects may at last be produced. Where the effects of cold affusion may be thought too severe, sponging the body with cold water, or water and vinegar, may be substituted.

The application of cold may be employed in fevers and febrile paroxysms, when the heat is steadily above the natural standard, and in many diseases arising from relaxation and debility. It is contra-indicated when the heat of the body is below 97°, when there is any notable perspiration from the surface, and when there is general plethora. Irritable habits should be defended from the violence of its action by covering the body with flannel.

In ardent fever, especially in those cases in which the heat of the skin is excessive, it is particularly useful, and ought to be long continued. In phrenitis, and other local inflammations, it promises to be of advantage. In gout its effects are doubtful, being in some instances salutary, in others destructive. A criterion, to enable us to determine when it ought or ought not to be resorted to in this disease, is much wanted. In inflammatory rheumatism and rheumatic gout it is decidedly useful. It is of advantage in all the hæmorrhagies and exanthemata; in tetanus, colic, cholera, hysteria, mania, ischuria, and in burns; and in general in all those local diseases in which solutions of acetate of lead, of muriate of ammonia, &c. are usually employed; for the good effects of these depend almost entirely on the diminished temperature.

ARBUTUS UVA URSI. *Ed. Dub. Lond.*

Willd. *g.* 871, *sp.* 7. Smith, *g.* 203, *sp.* 3.—*Decandria Monogynia.*—Nat. ord. *Bicornes*, Linn., *Ericineæ*, Juss.

Whortleberry. Red-berried trailing arbutus.

Officinal.—The leaves.

FOLIA ARBUTI UVÆ URSI. *Ed.*
FOLIA UVÆ URSI. *Lond. Dub.*

THIS is a very small evergreen shrub. The leaves are oval, not toothed, and their under surface is smooth and pale green. It grows wild in the woods, and on sand hills in Scotland, and in almost every country in Europe. It is also very common in New England and other parts of America. The *green* leaves alone, Dr Bourne says, should be selected and picked from the twigs, and dried by exposure to a moderate heat. The powder, when properly prepared, is of a light brown colour, with a shade of greenish yellow, has nearly the smell of good grass hay, as cut from the rick, and to the taste is at first smartly astringent and bitterish, which sensations gradually soften into a liquorice flavour. Digested in alcohol they give out a green tincture, which is rendered turbid by water, and when filtered passes transparent and yellow, while a green resin remains on the filter. They are powerfully astringent, approaching, in the deepness of the colour which they give to red sulphate of iron, more nearly to nutgalls, than any substance I have tried. Indeed, in some parts of Russia, they are used for tanning.

Medical use.—The medical effects of this medicine depend entirely on its astringent and tonic powers. It is therefore used in various fluxes arising from debility, menorrhagia, fluor albus, cystirrhœa, diabetes, enuresis, diarrhœa, dysentery, &c. It has been strongly recommended in phthisical complaints by Dr Bourne, and in diseases of the urinary organs by De Haen, particularly in ulcerations of the kidneys and bladder. With this view it is a popular remedy in America, and Dr Barton recommends it strongly in nephritic complaints and in gleet. It certainly alleviates the dyspeptic symptoms accompanying nephritic complaints. It is commonly given in the form of powder, in doses of from 20 to 60 grains three or four times a-day.

ARCTIUM LAPPA. *Ed. Dub.*

Willd. *g.* 1429, *sp.* 1. Smith, *g.* 352, *sp.* 1. *Syngenesia Polygamia Æqualis.*—Nat. ord. *Compositæ Capitatæ*, Linn., *Synantheræ*, sect. *Carduaceæ*, Juss.

Burdock. Clit-bur.

Officinal.—The root.

RADIX ARCTII LAPPÆ. *Ed.*
RADIX BARDANÆ. *Dub.*

THIS is a perennial indigenous plant, frequent in uncultivated places. The seeds have a bitterish subacrid taste; they are recommended as very efficacious diuretics, given either in the form of emulsion, or in powder, to the quantity of a drachm. The roots taste sweetish, with a light austerity and bitterishness; they are esteemed aperient, diuretic, and sudorific, and are said to act without irritation, so as to be safely ventured upon in acute disorders. Decoctions of them have been used in rheumatic, gouty, venereal, and other disorders, and are preferred by some to those of sarsaparilla.

ARGENTUM. *Ed.*
ARGENTUM; Argentum purificatum. *Lond.*
ARGENTUM in laminas extensum. *Dub.*

Silver. Silver leaf.

METALLIC SILVER is very brilliant, white, insipid, inodorous; specific gravity 10.474 to 11.091; hardness between iron and gold; elasticity between gold and copper; strong acute sound; considerable ductility and tenacity; hardening much under the hammer; a good conductor of electricity, caloric, and galvanism; fusible at 28° Wedgwood; crystallizable by cooling; unalterable in the air; changed into a greenish oxide by long and intense heat, burning with a greenish flame; and instantly by the electric shock. Its phosphuret is granulated, brittle, and fusible; its sulphuret grey, black, lamellated, or striated, and fusible; it unites but slightly with the acidifiable metals and iron; is hardened by gold, bismuth, antimony, tin, lead, and copper, and amalgamates with mercury. It is oxidized and dissolved by the sulphuric, sulphurous, and nitric acids, and combines with chlorine. Its oxide is olive; reducible by the other metals, hydrogen, and light and heat; colours some glasses of an olive green, and is very soluble in ammonia.

Silver is found,

I. In its metallic state;
  1. Pure.
  2. Alloyed with gold. Auriferous silver ore.
  3. ———————— antimony.
  4. ———————— iron and arsenic.
  5. ———————— bismuth and lead.

II. Combined with sulphur;
  1. Sulphuretted silver. Vitreous silver ore.
  2. ———————————— with antimony, iron, and arsenic. Black or brittle silver ore.
  3. ———————————— with lead and antimony. White silver ore.

III. Combined with chlorine. Corneous silver ore.

IV. Oxidized;
  1. Combined with sulphur and oxide of antimony. Red silver ore.
  2. Combined with carbonic acid and antimony.

Pharmaceutic use.—Silver is used in pharmacy for the preparation of the nitrate only.

ARISTOLOCHIA SERPENTARIA. *Ed. Lond. Dub.*

Gynandria Hexandria.—Willd. *g.* 1609, *sp.* 27. Nat. ord. *Sarmentosæ*, Linn., *Aristolochiæ*, Juss.

Virginian Snake-root.

Officinal.—The root.

RADIX ARISTOLOCHIÆ SERPENTARIÆ. *Ed.*
RADIX SERPENTARIÆ. *Lond.*
RADIX SERPENTARIÆ VIRGINIANÆ. *Dub.*

THIS is a small, light, creeping root, consisting of a number of strings or fibres matted together, issuing from one common head; of a brownish colour on the outside, and paler or yellowish within. It has an aromatic smell, like that of valerian, but more agreeable; and a warm, bitterish, pungent taste, very much resembling that of camphor. I find that, treated with alcohol, it affords a bright green tincture, which is rendered turbid by water; by filtration a small portion of a green matter is separated, but its transparency is not restored. It neither precipitates tannin or gelatin, nor affects the salts of iron or tincture of turnsole.

When the tincture diluted with water is distilled, the spirit and water pass over milky, strongly impregnated with its peculiar flavour.

Medical use.—Its virtues are principally owing to the essential oil with which it abounds. Its general action is heating and stimulant; its particular effects, to promote the discharge by the skin and urine. In its effects it therefore coincides with camphor, but seems to be a more permanent stimulus.

It is recommended,

1. In intermittent fevers, especially when the paroxysms do not terminate by sweating, and to assist the action of Peruvian bark in obstinate cases. In some parts of America, its tincture or infusion is the common morning dram in aguish situations.
2. In typhus and in putrid diseases, to support the *vis vitæ*, and to excite gentle diaphoresis.
3. In exanthematous diseases, when the fever is of the typhoid type, to support the action of the skin and keep out the eruption.
4. In gangrene. Externally it is used as a gargle in the putrid sore throat.

It is exhibited,

1. In powder, which is the best form, in doses of twenty or thirty grains.
2. In infusion with wine or water. By decoction its powers are entirely destroyed.

It is often combined with Peruvian bark, or with camphor.

ARMORACIÆ RADIX. *Lond.* See COCHLEARIA.

ARNICA MONTANA. *Ed. Dub.*

Willd. *g.* 1491, *sp.* 1. *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ radiatæ*, Linn., *Synantheræ*, sect. *Corymbiferæ*, Juss.

German Leopard's bane.

Officinal.—The flowers and root.

a) FLORES ARNICÆ MONTANÆ. *Ed.*
FLORES ARNICÆ. *Dub.*

LEOPARD'S-BANE is a very common perennial plant in the alpine parts of Germany, in Sweden, Lapland, and Switzerland. The flowers are of a yellow colour, and compound, consisting entirely of tubular florets.

These flowers have a weak bitterish taste, evidently combined with a degree of acrimony; and when rubbed with the fingers have a somewhat aromatic smell. Their active constituents are not sufficiently ascertained. Mercier has endeavoured to shew that they owe their acrimony to the agency of insects upon them, and that naturally they contain an aromatic principle, and modified tannin. But in their ordinary state they contain also an acrid resin and an unexamined peculiar vegetable principle, as pointed out by Weber, (strychnia?)

Medical use.—In their effects they are stimulating, and supposed to be discutient. In small doses, and properly administered, they possess very beneficial effects, in raising the pulse, in exciting the action of the whole sanguiferous system, in checking diarrhœas, in promoting expectoration, and, most particularly, in removing paralytic affections of the voluntary muscles; but their use is frequently attended with no sensible operation, except that in some cases of paralysis, the cure is said to be preceded by a peculiar pricking, and by shooting pains in the affected parts. When given improperly, or in too large doses, they excite an insupportable degree of anxiety, shooting and burning pains, and even dangerous hæmorrhagies, vomiting, vertigo, and coma. For these alarming symptoms, vinegar is said to be the best remedy.

They have been recommended,

1. In paralytic disorders, in chronic rheumatism, in retention of the urine from paralysis of the bladder, in amaurosis.
2. In intermittent fevers, combined with Peruvian bark.
3. In dysentery and diarrhœa, but in some cases they have had bad effects.
4. In putrid diseases.
5. In typhoid inflammations.
6. To promote the uterine discharge.
7. And internal pains, and congestions from bruises; and in the countries where they are indigenous, they have long been a popular remedy in such accidents.

They are contra-indicated by an inflammatory diathesis, a predisposition to hæmorrhagies, and internal congestions.

They are best exhibited in the form of infusion. One or two scruples may be infused in half a pound of water, and drunk at proper intervals. The flowers should be wrapt up in a piece of linen, as otherwise their down is apt to be diffused in the liquid, and to cause violent irritation of the throat.

Officinal.—The root.

b) RADIX ARNICÆ. *Dub. Ed.*

THE dried root of this plant is about the thickness of a small quill, and sends out fibres along on one side. Externally it is rough, and of a red brown colour, internally of a dirty white. Its taste is acrid, and slightly bitter. Neumann extracted from 960 parts 840 watery extract, and 5 alcoholic; and inversely 270 alcoholic, and 540 watery.

Medical use.—It is exhibited in the same manner and circumstances as the flowers, but is more apt to excite vomiting.

In powder, its dose is from five to ten grains.

ARSENICUM.

Arsenic.

ARSENIC has the form of grey plates, with metallic lustre; friable; specific gravity between 5.235 and 5.76; vaporizable at 356°; emitting a smell like garlic; crystallizable; tarnishing in the cold air; inflammable at a red heat, and sublimed in the form of the white oxide or acid; acidifiable by the nitric and nitrous acids; combines with phosphorus, sulphur, and many of the metals; soluble in hydrogen gas.

Arsenic is found,

I. In its metallic state:
    1. Alloyed with iron. Native arsenic.
    2. Combined with sulphur. Orpiment. Realgar.
    3. ———— iron and sulphur. Arsenical pyrites.
    4. ———— iron, sulphur, and silver. White arsenical pyrites.

II. Oxidized:
    White oxide of arsenic. Arsenious acid.

III. Acidified and combined:
    1. With lime.
    2. With copper.
    3. With iron.
    4. With lead.
    5. With nickel.
    6. With cobalt.

OXIDUM ARSENICI. *Ed.*

ARSENICUM; Oxydum album. *Dub.*

ARSENICUM ALBUM, s. s. Acidum Arseniosum. *Lond.*
Oxide of Arsenic. Arsenious acid.

THIS substance, which was formerly named, improperly, Arsenic, is most generally obtained in the process of roasting the ores of cobalt in Saxony. The roasting is performed in a kind of reverberatory furnace, with which a very long chimney is connected, lying in a horizontal direction. The arsenious acid is condensed in it in the form of a loose grey powder, which, by a second sublimation with a little potash, and in a great degree of heat, coalesces into a firm vitreous sublimate, which gradually becomes opaque, like white enamel, by exposure to the air. In this state, it is the white arsenic of commerce, or, as it should be termed, the arsenious acid. For internal use, the lumps of a shining appearance and dazzling whiteness should be chosen; but it is generally offered to sale in the form of powder, which is very often mixed with chalk or gypsum. The fraud is easily detected by exposing it to heat. The arsenious acid is entirely sublimed, and the additions remain behind.

As this substance is one of the most virulent poisons, I shall give a detailed account of its properties. It is white, compact, brittle, and of a glassy appearance. Its taste is sweetish, but acrid, and slow in manifesting itself. It sublimes entirely when exposed to 283° Fahrenheit. When the operation is performed in close vessels, the arsenious acid sublimes in dense white fumes, which concrete into tetrahedrons, but the crystals become gradually opaque on exposure to the air. Arsenious acid is soluble in 80 waters at 60°, and in 15 at 212°. This solution has a slightly acrid taste, and reddens vegetable blues. It is also soluble in 80 times its weight of boiling alcohol. From either solution it may be obtained regularly crystallized in tetrahedrons. From its solutions a white precipitate is thrown down by lime-water, a yellow precipitate by sulphuretted hydrogen, or water impregnated with it, or by any alkaline sulphuret or hydro-sulphuret, and, still more characteristically, a fine green precipitate by a solution of sulphate of copper, and a copious yellow precipitate by a solution of nitrate of silver. But as the addition of an alkali, in order to saturate the acid, is necessary to the success of these metallic tests, the liquid ammoniarets of copper and of silver are preferable. Mixed with a little sulphur, it sublimes of an orange or red colour. When treated with nitric acid, the arsenious acid is converted into arsenic acid. If arsenic be reduced between plates of copper, or in contact with copper-filings, it whitens them, and, lastly, the fumes of reduced arsenic have a strong alliaceous smell.

Dr Christison, the present Professor of Medical Jurisprudence in this University, has greatly simplified and improved the means of detecting arsenic, which it is important to practitioners in general to know. The suspected matter, if solid, is to be divided into minute fragments, and boiled briskly in two or three successive portions of distilled water. To this decoction, or to a suspected fluid, a little acetic acid is to be added, and the mixture to be boiled for a few minutes. It is then to be filtered, put into a deep narrow glass, and to be subjected, for half or three quarters of an hour, to a brisk stream of sulphuretted hydrogen gas. The fluid always acquires a yellowish milkiness, or a precipitate is thrown down; but before attempting to separate the precipitate, it is to be boiled. It is now to be left at rest to deposite; the supernatant liquid is then to be poured off, and the precipitate, if necessary, washed with water. The precipitate is then to be thrown on a filter. After the filtration is finished, the filter is to be carefully compressed between folds of blotting paper, and the precipitate scraped off with a knife, and dried on a bit of smooth paper, at a temperature somewhat above 212°, and subjected to the test of reduction, which is to be conducted in the following manner.

The best substance for reducing arsenic on the small scale is the black flux. If the quantity of matter be not considerable, the reduction should never be attempted but in a glass tube closed at one end. It should not be above three inches long; its diameter may vary from an eighth to a fourth of an inch, according to the quantity of material. The matter should not fill above three-fourths of an inch of the length of the tube. It is introduced most easily, without soiling the tube, by placing it in a little triangular gutter of thin pasteboard, sliding this nearly to the bottom, and then knocking the sealed end gently on the table. The pasteboard being withdrawn, the sealed end of the tube is to be held (naked) in the flame of a spirit-lamp, or common blow-pipe lamp; but the former is preferable, as no blow-pipe is required, and the heat is never too violent. The open end of the tube should not be closed, as is generally recommended. The heat must be applied gently at first, otherwise the watery vapour disengaged may propel the material out of the tube. As fast as the moisture condenses on the upper part of the tube, it should be dried by a little roll of filtering paper. When the watery vapour has nearly ceased to be disengaged, a black vapour rises and condenses on the tube. This is charcoal, derived from the decomposition of the animal or vegetable matter, and carried along by the steam and gases. The arsenic does not begin to sublime till the discharge of carbonaceous vapour has nearly ceased; and it always condenses lower down, and within the shortest possible distance from that part of the tube which is exposed to the flame.

Arsenious acid is used by the dyers, as a flux in glass making, in docimastic works, and in some glazes. Arsenious sulphurets are much used by painters, but these advantages are not able to compensate for its bad effects. In mines, it causes the destruction of numbers who explore them. The property which it possesses of being soluble in water, increases and facilitates its destructive power; and it ought to be proscribed in commerce, by the strict law which prohibits the sale of poisons to unknown persons. Arsenious acid is every day the instrument by which victims are sacrified, either by wickedness or imprudence. It has been mistaken for sugar or cream of tartar, and these mistakes are attended with the most dreadful consequences. The only symptoms which characterize this poison are, pains in the stomach and bowels, vomiting of glairy and bloody matter, purging, with cold sweats and trembling, very much like *cholera*. Sometimes there are no pains, only debility and fainting, with vomiting and purging.

On dissection, the stomach and bowels are sometimes found to be inflamed, and corrugated or gangrenous; rarely corroded. The lungs are frequently marked with livid spots. Sometimes there is no morbid appearance to be discovered. The state of the blood is very various, as well as the external appearance of the body, which is sometimes perfectly natural. When the quantity is so very small as not to prove fatal, tremors, palsies, and lingering hectics succeed.

Mucilaginous drinks have been long ago given to persons poisoned by arsenic. Milk, fat, oils, and butter, have been successively employed. M. Navier has proposed, as a more direct counter-poison, one drachm of sulphuret of potass to be dissolved in a pint of water, which the patient is directed to drink at several draughts; the sulphur is supposed to unite with the arsenic, and destroy its causticity and effects. When the first symptoms are alleviated, he advises the use of sulphureous mineral waters. He likewise approves the use of milk, but condemns oils. Vinegar, which dissolves arsenic, has been recommended by M. Sage. According to Hahneman, a solution of soap is the best remedy. One pound of soap may be dissolved in four pounds of water, and a cupful of this solution may be drunk lukewarm every three or four minutes. But M. Orfila agrees with Renault in thinking, that no antidote has yet been discovered. Blood-letting has lately been recommended in cases of poisoning from arsenic, on the idea that the death is the consequence of inflammation.

Medical use.—Notwithstanding the very violent effects of arsenious acid, it has, however, been employed in the cure of diseases, both as applied externally, and as taken internally.

Externally, it has been chiefly employed as an escharotic in cases of cancer.

Various methods of using arsenic externally have been recommended, but they all resolve themselves into the means of moderating its action. Sulphur has been thought to have a specific effect in this way, but without foundation. It only acts as an inert powder, diluting the arsenic. Its admixture with ointments and extracts, in like manner, prevents it from coming so fully in contact with the surface to which it is applied; but opium operates by reducing the sensibility of the part, and, in a larger dose, of the system, while the local action of the arsenic is reduced in no greater a degree than it would be by the addition of an equal quantity of any inert extract.

Justamond used an ointment composed of four grains of white oxide of arsenic, ten grains of opium, and a drachm of cerate, spread very thin upon linen. He also fumigated cancerous sores with sulphuret of arsenic, with a view to destroy their intolerable fetor, with great success. Le Febure washed cancerous sores frequently, in the course of the day, with a solution of four grains of arsenious acid in two pounds of water. Arnemann recommends an ointment of one drachm of arsenious acid, the same quantity of sulphur, an ounce of distilled vinegar, and an ounce of ointment of white oxide of lead; but it must be observed that arsenic acts upon different principles from other escharotics, which either act chemically on the parts with which they come in contact, destroying alike the sound and the diseased, or by inducing inflammation and consequent suppuration or sphacelation of the surface; whereas arsenic seems to act by destroying the feeble vitality of the diseased formation in its whole extent, causing it to be thrown out of the system as a substance foreign to its nature; and thus, when arsenic succeeds, the morbid part is separated in a mass. This fortunate termination is, however, exceedingly rare, and more commonly the ulceration proceeds more rapidly than before; and in some cases its application has been the direct cause of death, by poisoning the patient, in consequence of its absorption. This, I am convinced, is apt to take place whenever arsenic is applied to a *bleeding* surface; for, by experiment, a much smaller quantity produces its poisonous effects when introduced into a wound than when swallowed into the stomach. To a suppurating, but otherwise entire surface, it has often been applied with the greatest freedom, without producing any poisonous effects.

Internally, it may be exhibited in the form,

1. Of arsenious acid dissolved in distilled water, in the proportion of four grains to a pint. A table spoonful of this solution, mixed with an equal quantity of milk, and a little syrup of poppies, is directed to be taken every morning fasting, and the frequency of the dose gradually increased until six table spoonfuls be taken daily. M. Le Febure's method of curing cancer.

2. Of arsenite of potass, an officinal preparation.

3. Of arseniate of potass. Mix well together equal quantities of nitrate of potass, and of pure arsenious acid; put them into a retort, and distil at first with a gentle heat, and afterwards with so strong a heat as to redden the bottom of the retort. In this process the nitric acid is partly decomposed, and passes over into the receiver in the state of nitrous acid. The arsenious acid is at the same time converted into arsenic acid, and combines with the potass. The product, which is arseniate of potass, is found in the bottom of the retort, and may be obtained in the form of crystals, of a prismatic figure, by dissolving it in distilled water, filtering the solution through paper, evaporating, and crystallizing. An arseniate of soda may be prepared in the same way by decomposing arsenious acid with nitrate of soda. The advantages of these preparations are their uniformity and ready solubility, by which their dose can be better regulated.

4. Arsenious acid, in substance, to the extent of an eighth of a grain for a dose, combined with a little sublimed sulphur, has been said to be exhibited in some very obstinate cases of cutaneous diseases, and with the best effect. The sulphur seems merely to divide the arsenic.

5. Combined with six times its weight of black pepper, it is given by the native physicians in the East Indies for the

cure of the Persian fire (syphilis,) and a species of elephantiasis, called juzam. The effect of the pepper is very doubtful.

The internal use of arsenic has been lately much extended, in consequence of the observations of Dr Fowler, Mr Jenkinson, Dr Bardsley, Dr Kellie, Mr Hill, &c. Before Dr Fowler wrote, it was indeed in use empirically, for the cure of cancers, and even as a popular remedy, in various countries; as in the East Indies, against cutaneous affections; and in the fens of Hungary and Lincolnshire, against the ague. But Dr Fowler, by that inductive method of ascertaining its effects which he so successfully practised, first recommended it to the notice of regular practitioners. He confined himself to the advantages derived from it in periodical diseases, and in the disease described by Dr Haygarth under the title of nodosity of the joints; but Mr Jenkinson has, more recently, extended the use of it to certain painful affections of the bones, cases of "very long standing, attended with great debility, and local affections, not of the muscles and integuments, but of the ends of the bones, cartilages, or ligaments, or of all three together." He thinks it hurtful in recent affections, except where there are regular intermissions. For a complete list of the diseases in which it has been tried, Mr Hill's paper in the Edinburgh Medical Journal, vol. v. and vi. may be consulted.

The great difficulty attending the exhibition of so very active a remedy, is regulating the dose so as to produce the full effect, without carrying it farther than is absolutely necessary. Dr Kellie has accurately pointed out the precautions to be observed with this view. He always gives arsenic immediately after meals, under the idea that it will be less apt to affect the stomach when full than when empty. "From all I have observed, I have little apprehension of risk in a guarded and judicious use of the arsenical solution. It will always be proper to begin with the smallest doses, in order to ascertain how it agrees with the stomach. Having suited the dose to this, the feeling of swelling and stiffness of the palpebræ and face, heat, soreness, and itching of the tarsi, or tenderness of the mouth, are proofs that the medicine is exerting its specific effects on the constitution; that the dose has been carried to a sufficient length; and that it is time to decrease the dose, and attentively to watch its future effects. On the appearance of erythema, or salivation, it is time to interrupt, altogether, for a while, the exhibition of arsenic; if necessary, it may be resumed when these symptoms have vanished. If pain of the stomach, nausea, or vomiting supervene; if the head be affected with pain or vertigo; or should a cough, with any signs of irritation of the pulmonary organs, be observed, the use of arsenic should be totally and for ever abandoned."

ARTEMISIA.

Willd. *g.* 1743. *Syngenesia Polygamia superflua.*—Nat. ord. *Compositæ discoideæ*, Linn., *Synantheræ*, sect. *Corymbiferæ*, Juss.

Sp. 8. ARTEMISIA ABROTANUM. *Dub.*

Southernwood.

Off.—The leaves.

FOLIA ABROTANI. *Dub.*

THIS is a perennial shrub, which grows readily in our gardens, though a native of the south of Europe.

Southernwood has a strong smell, which to most people is not disagreeable; it has a pungent, bitter, and somewhat nauseous taste. These qualities are very completely extracted by alcohol, and the tincture is of a beautiful green colour. They are less perfectly extracted by watery liquors, the infusion being of a light brown colour.

Med. use.—Southernwood, as well as some other species of the genus, has been recommended as an anthelmintic: and it has also been sometimes used as stimulant, detergent, and sudorific. Externally, it has been employed in discutient and antiseptic fomentations; and under the form of lotion and ointment, for cutaneous eruptions, and for preventing the hair from falling off. But it is at present very rarely used in any way.

Sp. 42. ARTEMISIA MARITIMA. *Dub.*

Sea Wormwood.

Off.—The tops.

CACUMINA ABSYNTHII MARITIMI. *Dub.*

THIS species of artemisia is perennial and herbaceous. It grows wild in salt marshes, and in several parts about the sea-coasts. In taste and smell, it is weaker and less unpleasant than the common wormwood, and is now almost rejected from practice.

Sp. 26. ARTEMISIA SANTONICA. *Ed. Dub.*

Wormseed.

MEDICAL DEPARTMENT,
YORKSHIRE COLLEGE,
VICTORIA UNIVERSITY.

Off.—The tops.

CACUMINA ARTEMISII SANTONICI. *Ed.*
CACUMINA SANTONICI. *Dub.*

THE Edinburgh and Dublin Colleges have named this species as the plant which produces these seeds; but the fact is by no means ascertained. They have been ascribed by different writers to other species of the same genus, the Judaica, the Contra, and the Austriaca, which is not improbable, and they are even said by Saunders to be the produce of a Chenopodium, which is not at all likely.

The seeds themselves are very small, oblong, smooth, and of a greenish or greyish yellow colour. As the whole head is gathered after the seeds are ripe, they are mixed with the scales of the calices, and bits of stalks. Their taste is bitter, and somewhat acrid; their smell strong and disagreeable. Those which come from Aleppo are esteemed the best, and those from Barbary the worst. When they have no smell, and a less intensely bitter taste, and are discoloured, and mixed with a longer kind of seed, they are to be rejected. They are also adulterated with the seeds of tansy and wormwood. The latter are easily known, by having a light yellow colour, and resembling powdered hay more than seeds. Neumann obtained from 480 parts, 213 of alcoholic extract, and 110 watery; and inversely, 260 watery, and 28 alcoholic. It gave a slight flavour to water distilled from it, but no oil.

Med. use.—Wormseed is one of the oldest and most common anthelmintics, especially in the lumbrici of children. On account of their essential oil, they are heating and stimulating.

They are given to children in substance, to the extent of ten grains, or half a drachm, finely powdered, and strewed on bread and butter; or made into an electuary with honey or treacle; or candied with sugar; or diffused through milk, and taken in the morning, when the stomach is empty; or in infusion or decoction; but to these forms their bitterness is a strong objection. After they have been used for some days, it is customary to give a cathartic, or they are combined, from the beginning, with rhubarb, jalap, calomel, sulphate of iron, or muriate of ammonia.

Sp. 63. ARTEMISIA ABSINTHIUM. *Ed. Dub. Lond.*
Common Wormwood.

Off.—The leaves and flowering heads.

a) ABSINTHIUM. *Lond.*
FOLIA ABSINTHII VULGARIS. *Dub.*
FOLIA ARTEMISIÆ ABSINTHII. *Ed.*
b) CACUMINA ABSYNTHII VULGARIS. *Dub.*
SUMMITATES ARTEMISIÆ ABSYNTHII. Summitates florentes. *Ed.*

THIS perennial herb grows by the road-sides, and on rubbish, in many parts of Britain: and about London it is cultivated for medical use. Its smell is strong and disagreeable; its taste intensely bitter. Its active constituents are bitter extractive and essential oil. It is used in stomach complaints, and is of great service to hypochondriacs. It is also employed in intermittent fevers, in cachectic and hydropic affections, in jaundice, and against worms. The herb is used in antiseptic fomentations, and macerated in water it is applied to bruises to prevent the swelling and discoloration. Many persons cannot suffer the disagreeable smell of wormwood, which is apt to occasion headach; but it may be freed from it in a great measure by decoction. The extract is a pure and simple bitter. The essential oil is of a dark green colour, and contains the whole flavour of the plant. It is stimulating, and is supposed to be a powerful antispasmodic and anthelmintic. Wormwood was formerly much used for the preparation of medicated wines and ales.

ARUM MACULATUM. *Dub.*

Monœcia Polyandria. Willd. *g.* 1705, *sp.* 17. Smith, *g.* 402, *sp.* 1.—Nat. ord. *Piperitæ*, Linn., *Aroideæ*, Juss.

Wake robin.

Officinal.—The recent root.

RADIX RECENS ARI. *Dub.*

THIS is a perennial solid bulbous-rooted-plant, which grows wild in shady situations, and by the sides of banks, in many parts of Britain. The root is knotty, roundish, and white. When collected in spring, before the leaves shoot, or in autumn, after flowering, it contains a very acrid milky juice. By drying, it loses the greatest part of its acrimony, and becomes simply amylaceous. It is also rendered perfectly mild by frequent washing with water. Its acrimony does not rise in distillation, and is not contained in its extract, although the root is thereby deprived of it. Neumann obtained from 480 of the dry root, 20 of alcoholic extract, and about 180 watery. The former had some slight pungency, the latter none. Its acrimony is therefore easily destructible; and as it does not arise from the presence of an essential oil, it depends upon a vegetable principle, different from all others, not yet investigated.

Medical use.—In the recent root, the degree of acrimony is very uncertain, but it is a drastic purgative, and is never used. The dried root is perfectly inert, so much so, that the French prepare from it the harmless cosmetic, called *Cypress powder*; and in years of scarcity it is even used as food.

ASARUM EUROPÆUM. *Ed. Dub. Lond.*

Willd. *g.* 925, *sp.* 1. Smith, *g.* 222, *sp.* 1. *Dodecandria Monogynia.*—Nat. ord. *Sarmentaceæ*, Linn., *Aristolochiæ*, Juss.

Asarabacca.

Officinal.—The leaves.

FOLIA ASARI EUROPÆI. *Ed.*
FOLIA ASARI. *Lond. Dub.*

THIS perennial plant is indigenous in England, although the dried roots are generally brought from the Levant. It grows in moist and shady situations. It produces only two leaves, which are reniform and very obtuse. The root is fibrous, of a grey-brown colour externally, but white within. Both the roots and leaves have a nauseous, bitter, acrimonious, hot taste; their smell is strong, and not very disagreeable.

It seems to contain, besides its odorous principle, an acrid principle, upon which its virtues depend; and we find that asarabacca loses much of its activity by decoction and long keeping.

Medical use.—Given in substance from half a drachm to a drachm, it evacuates powerfully both upwards and downwards. It is said, that alcoholic tinctures possess both the emetic and cathartic virtues of the plant; that the extract obtained by inspissating these tinctures acts only by vomiting, and with great mildness; that an infusion in water proves cathartic, rarely emetic; that aqueous decoctions made by long boiling, and the watery extract, have no purgative or emetic quality, but prove good diaphoretics, diuretics and emmenagogues.

We principally use this plant as a sternutatory. The root of asarum is one of the strongest vegetable errhines; and it is the active ingredient in most of the empyrical *herb snuffs*. Snuffed up the nostrils, in the quantity of a grain or two, it occasions a copious evacuation of mucus, and sneezing. The leaves are considerably milder, and may be used in the quantity of three, four, or five grains. Geoffroy relates, that after snuffing up a dose of this errhine at night, he has frequently observed the discharge from the nose to continue for three days together, and that he has known a paralysis of the mouth and tongue cured by one dose. He recommends this medicine in stubborn disorders of the head, proceeding from viscid tenacious matter, in palsies, and in soporific distempers.

ASPIDIUM FILIX MAS. *Lond. Ed.* Willd. *g.* 1962, *sp.* 94. Smith, *g.* 429, *sp.* 4.—Nat. ord. *Filices*, Linn. Juss.

POLYPODIUM FILIX MAS. *Dub.*

Male fern. Male shield fern.

Off.—The root.

RADIX ASPIDII FILICIS MARIS. *Ed.*
RADIX FILICIS MARIS. *Dub.*
RADIX FILICIS. *Lond.*

THIS fern is perennial, and is found in great abundance in our woods. The root consists of many egg-shaped knots, closely compressed together, forming a crooked mass of a blackish colour, and covered with brown scales. When chewed, its taste is somewhat mucilaginous and sweet, and afterwards slightly astringent and bitter. Its smell is also weak.

Medical use.—This root was used as an anthelmintic in the days of Dioscorides. It gradually became neglected; but its use was again revived at different times by Madame Nuffer, Herrenschwand, aud others, who frequently succeeded in killing and expelling the tapeworm, by the exhibition of secret remedies, of which the fern powder was, or rather was supposed to be, the principal ingredient; for there is much reason to believe, that the active purgatives with which it was always combined, were really the remedies which effected the cure.

The internal solid part of the root only is to be powdered, and the powder should have a reddish colour.

ASSAFŒTIDÆ GUMMI RESINA. *Lond. Dub.* See FERULA.

ASTRAGALUS TRAGACANTHA. *Ed. Dub.*
ASTRAGALUS VERUS. Olivier. *Lond.*
Willd. *g.* 1379, *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ*, Linn., *Leguminosæ*, sect. *Papilionaceæ*, Juss.
Tragacanth shrub.

Off.—Gum Tragacanth.

GUMMI ASTRAGALI TRAGACANTHÆ, *ex variis astragali speciebus. Ed.*
GUMMI TRAGACANTHA. *Dub.*
TRAGACANTHA gummi. *Lond.*

AUTHORS are not agreed about the species of Astragalus which yield tragacanth. The London College has recognised the authority of Olivier upon the subject. After admitting that other species also yield this gum, he says, " The Astragalus, which appears to us the most common, and that from which almost all the Tragacanth of commerce is derived, has not been described by any botanist." In a note upon the description, which it is unnecessary to insert, he characterises it as " *Astragalus verus*, fruticosus, foliolis villosis, setaceis, subulatis; floribus axillaribus, aggregatis, luteis." The celebrated Tournefort, in his travels in the Levant, saw tragacanth of fine quality abundantly produced by the *A. Creticus* growing upon Mount Ida. An inferior kind is produced from the *A. gummifer* upon Mount Libanus, according to Billardiere. The *A. tragacantha*, which grows at Marseilles, yields no gum; but Richard says that it seems to furnish it in warmer climates. Tragacanth exudes naturally from July to September, either from wounds made in the shrub by animals, or from fissures occasioned by the force of the *succus proprius*, during the great heats of summer. According as the juice is more or less abundant, tragacanth exudes in tortuous filaments, which sometimes assume the form of a small worm, or of a pretty thick worm, elongated, rounded, or compressed, rolled up upon itself, or twisted. The finest and purest tragacanth assumes this form. It is almost transparent, whitish, or of a yellowish white. It also exudes in large tears, which preserve more or less of the vermicular form. This is more of a reddish colour, and more contaminated with impurities. It sometimes adheres so strongly to the bark, as to bring part of it with it in gathering it. The quantity of tragacanth furnished by Persia is very considerable. Much is consumed in that country in the manufacture of silk, and the preparation of comfits. It is exported to India, Bagdad, and Bussorah. Russia also gets some by the way of Bakou.

Tragacanth, though generally called a gum, differs very much from gum Arabic in its properties. It is opaque, white, difficultly pulverizable, unless when thoroughly dried, and the mortar heated, or in frost. Lewis properly observes, that it cannot be properly said to be soluble in water; for, put into water, it absorbs a large proportion of that fluid, increasing immensely in volume, and forming with it a soft paste, rather than a fluid mucilage; and although it is easily diffused through a larger proportion of water, after standing a day or two, the mucilage subsides again, the supernatant fluid retaining little of the gum. The solution is adhesive, but cannot be drawn out into threads, and it moulds readily, acquiring a fetid smell. Besides these remarkable differences from gum Arabic in regard to brittleness, insolubility, and the quantity of water which it thickens, I find that tragacanth is not precipitated by silicized potass, and is precipitated by sulphate of copper, acetate of lead, and nitrate of mercury. It is totally insoluble in alcohol.

In pharmacy it is employed for forming powders into troches, and rendering tough cohesive substances, such as colocynth, pulverizable, by beating them with mucilage of tragacanth, and then drying the mass. For electuaries it is improper, as it renders them slimy on keeping. It is also an improper adjunct to active powders, as it swells up on attempting to mix them with water.

ATROPA BELLADONNA. *Ed. Lond. Dub.*

Willd. *g.* 381, *sp.* 2. Smith, *g.* 100, *sp.* 1.—*Pentandria Monogynia.*—Nat. ord. *Solanaceæ*, Linn., *Solaneæ*, Juss.

Deadly nightshade.

Off.—The leaf.

ATROPÆ BELLADONNÆ FOLIA. *Ed.*

BELLADONNÆ FOLIA. *Lond. Dub.*

THE deadly nightshade is a perennial plant, with a herbaceous stem, which is indigenous both in mountainous and woody situations in this country, and often cultivated in gardens. The whole plant is poisonous, and the berries, from their beautiful appearance, have sometimes proved fatal to children. The symptoms excited are, dryness of the mouth, trembling of the tongue, very distressing thirst, difficulty of swallowing, fruitless efforts to vomit, and great anxiety about the præcordia. Delirium then comes on, with gnashing of the teeth, and convulsions. The pupil remains dilated, and is not sensible even to the stimulus of light. The face becomes tumid, and of a dark red colour. The jaws are frequently locked. Inflammation attacks the œsophagus, stomach, and intestines, sometimes extending to the mesentery, lungs, and liver, accompanied with violent pains in the abdomen. The stomach is very insensible to stimulus, and the peristaltic motion of the intestines is destroyed. General relaxation, palsy, especially of the lower extremities, convulsions, vertigo, blindness, coma, and death succeed. The body soon putrifies, swells, and becomes marked with livid spots; blood flows from the nose, mouth, and ears, and the stench is insufferable. On dissection the blood is found to be fluid, the intestines are inflated and inflamed, or eroded and gangrenous. The best method of cure is to excite vomiting as soon as possible, by emetics, and tickling the fauces; to evacuate the bowels by purgatives and glysters; and to give largely, vinegar, honey, milk, and oil. In some children who recovered by this treatment, the delirium was succeeded by a profound sopor, accompanied with subsultus tendinum; the face and hands became pale and cold, and the pulse small, hard, and quick. Their recovery was slow, and the blindness continued to a considerable time, but at last went off.

Belladonna has been best analyzed by Mr Brandes, apothecary in Salz-Uffeln, who has discovered in it a new alkaloid, upon which its narcotic virtues depend. 2000 parts of the fresh plant yielded 506 of watery extract, 55 of extract by cold alcohol, and 60 by boiling alcohol, besides what was extracted by further manipulations. Its composition was very complex. It contained acids, (malic, oxalic, nitric, muriatic, phosphoric and sulphuric); bases, (atropia, potass, lime, magnesia and ammonia); gum, amylum, wax, green wax, pseudotoxia, vegetable gluten, and albumen. The atropia may be obtained separate, by making a decoction of belladonna, expressing the decoction, adding sulphuric acid as long as there is any precipitation, and, lastly, adding to the acid liquor a solution of potass as long as there is any precipitate, which is the atropia. The supernatant fluid is chiefly to be separated by careful decanting, and the last portion only to be put on a filter to be washed and dried. Atropia consists of very small brilliant transparent prisms of a dazzling white colour. It has no taste, although it seems to be more soluble in water than daturia or delphinia, although not so much so as picrotoxia. Cold alcohol does not act upon it, but boiling alcohol dissolves it, from which it separates in cooling. Æther and oil of turpentine do not act upon it, but warm almond oil dissolves a portion. With acids it forms soluble and crystallizable salts.

Mr Brandes urges the necessity of caution in the examination of atropia and its salts. Even the vapour of their solutions causes dilatation and paralysis of the pupil; and during the whole time of the experiments, Mr Brandes experienced violent headach, vertigo, pain of back, and nausea, so that he could scarcely continue them. On tasting a small quantity of sulphate of atropia, which was rather salt than bitter, he had extreme confusion of head, trembling in all his limbs, alternate rigors and heat, violent tension of the chest and dyspnœa, pulse weak, action of the heart scarcely perceptible, and at last retching. But the most severe of these symptoms abated in half an hour.

Medical use.—Yet this virulent poison, under proper management, may become an excellent remedy. Besides its narcotic power, it promotes all the excretions; but its exhibition requires the greatest caution; for it is apt, when continued for any length of time, even in small doses, to cause dryness and tension of the throat and neighbouring parts, vertigo, dimness of sight, and even temporary blindness. When any of these symptoms occur, its use must be suspended for some time, and afterwards resumed in smaller doses.

Deadly nightshade has been exhibited,

1. In several febrile diseases; in obstinate intermittents; and in the plague.
2. In inflammations; the gout.
3. In comatose diseases; in palsy, and loss of speech from apoplexy.
4. In spasmodic diseases; in chorea, epilepsy, chincough, hydrophobia, melancholy, and mania.
5. In cachectic affections; in dropsies, and obstinate jaundice.
6. In local diseases; in amaurosis, ophthalmia, in scirrhus, and cancer.
7. As an antidote to the contagion of scarlatina.

Deadly nightshade is best exhibited in substance, beginning with a very small dose of the powdered leaves or root, such as the fourth or eighth part of a grain for children, and one grain for adults, to be repeated daily, and gradually increased. In hydrophobia, Munch gave the powdered root every second morning, to the extent of from one to five grains to children, and fourteen or fifteen grains to adults.

The watery infusion is also a powerful remedy. One scruple of the dried leaves is infused in ten ounces of warm water, and strained after cooling. At first two ounces of this may be given daily to adults, and gradually increased, until the tension of the throat shews that it would be imprudent to go farther.

The watery extract is not a judicious preparation for internal use, on account of its great inequality.

Externally, the powdered leaves are applied as a narcotic to diminish pain, and to cancerous and ill-conditioned sores. From its effect, in dilating the pupil for some time, Professor Reimarus proposed, and tried with success, the dropping a little of the infusion or solution of the extract into the eye, a few hours before performing the extraction for the cataract, with a view of facilitating the operation. It is now understood that a solution of the extract is the nostrum applied by Mr Williams, and other itinerant oculists, indiscriminately in all cases of blindness, and with wonderful effect, where the blindness depends upon opacity of the central portion of the lens. In such a case, under the care of Dr Hill of Greenock, a young lady was enabled to possess vision, by keeping the pupil dilated during the day, which required its application four times a-day. She had used it eight years, and its good effects rather increased than diminished.

AVENA SATIVA. *Ed. Lond.*

Willd. *g.* 142, *sp.* 13. *Triandria Digynia.*—Nat. ord. *Gramina*, Linn., Juss.

Oats.

Off.—The husked seed; groats and the meal.

a) SEMINA AVENÆ SATIVÆ. Semina decorticata. *Ed.*
SEMINA AVENÆ. Semina tunicis nudata. *Lond.*
b) FARINA AVENÆ SATIVÆ ex seminibus. *Ed.*

THIS is a well-known annual plant, which is very generally cultivated in northern countries, and in many places furnishes the principal subsistence of the people. When simply freed from the husks, this grain gets the name of groats, but it is more frequently ground into meal. Groats are made use of in broths. Oatmeal is baked with salt and water into cakes, or, with the same additions, is boiled to form porridge, two very important articles of food in this country. An infusion of the husks in water, allowed to remain till it becomes acidulous, is boiled down to jelly, which is called sowins. In all these forms it is nutritious, and easy of digestion.

Vauquelin found in the ashes of oats, phosphate of lime and silica.

Med. use.—Gruels or decoctions, either of groats or oatmeal, either plain or acidified, or sweetened, form an excellent drink in febrile diseases, diarrhœa, dysentery, &c. and from their demulcent properties, prove useful in inflammatory disorders, coughs, hoarseness, roughness, and exulcerations of the fauces. Porridge is also frequently applied to phlegmonous swellings, to promote their suppuration.

AURANTII BACCÆ ET CORTEX. *Lond. Dub.* See CITRUS.

BALSAMUM CANADENSE. *Dub.* See PINUS.

BALSAMUM COPAIBÆ. *Dub.* See COPAIFERA.

BALSAMUM PERUVIANUM. *Lond. Dub.* See MYROXYLON.

BALSAMUM TOLUTANUM. *Lond. Dub.* See TOLUIFERA.

BARDANA. *Dub.* See ARCTIUM.

BARILLA. *Dub.* See SODA.

BARYTÆ CARBONAS. *Ed.*
Carbonate of baryta, Barytes. Heavy spar.

CARBONATED BARYTA is rarely found in nature. It was first discovered by Dr Withering, and hence Mr Werner gave it the name of Witherite. Its colour is greyish-white, sometimes inclining to milk white, and sometimes with a slight tinge of yellow, from a mixture of iron, seldom greenish, often invested with a red ochrey crust. It is found in solid masses, sometimes filling an entire vein, sometimes interspersed with sulphated baryta, frequently rounded, or affecting that form, seldom crystallized. Texture fibrous; fracture conchoidal; fragments, long splinters; specific gravity 4.3 to 4.338. Although it has no sensible taste, it is poisonous. In medicine it is only used for preparing the muriate of baryta. It is found in Lancashire, Cumberland, Scotland, and Sweden, but is not common.

BARYTÆ SULPHAS. *Ed.*
Sulphate of baryta. Ponderous spar.

THIS salt is found in great abundance. The foliated is in general the purest. Its specific gravity is from 4.4 to 4.865. It is insoluble in water. It is soluble in boiling concentrated sulphuric acid. It decrepitates when suddenly heated. By being formed into a thin cake with flour and water, and being afterwards heated to redness, it becomes phosphorescent. Heated to redness with charcoal, it is converted into a sulphuret, and it may be decomposed by the carbonates of potass and of soda.

BECCABUNGA. *Dub.* See VERONICA.

BELLADONNÆ FOLIA. *Lond. Dub.* See ATROPA.

BENZOINUM. *Lond. Dub.* See STYRAX.

BISMUTHUM. *Lond.*
Bismuth.

BISMUTH is a rare metal, but occurs most frequently in a metallic state in Saxony, Sweden, France, and Cornwall.

It is found,

- I. Native.
- II. Sulphuret;
  - 1. Common.
  - 2. With copper.
  - 3. With lead and copper.
- III. Oxidized, very rare.

Bismuth is white, slightly yellow, in large specular plates; pulverizable; specific gravity 9.822; moderately hard; sensible odour and taste, fusible at 460°, and volatile at a high temperature; oxidizable by heat and air; oxide vitrifiable into a greenish-yellow glass; oxidizable by boiling sulphuric, nitric, and muriatic acids; unites with sulphur. Oxide yellow, and colours glass of a greenish-yellow.

Bismuth is officinal only on account of the subnitrate prepared from it.

BISTORTÆ RADIX. *Lond. Dub.* See POLYGONUM.

BITUMEN PETROLEUM. *Ed.*
PETROLEUM. *Lond.*
PETROLEUM BARBADENSE, s. s. Bitumen Petroleum. *Dub.*
Rock oil. Barbadoes tar.

BITUMEN is now employed as the generic name for several inflammable bodies of different degrees of consistency, from perfect fluidity to that of a brittle but very fusible solid, and of little specific gravity. They are insoluble in alcohol or in water, combine with essential oils and sulphur, decompose only a small proportion of nitrate of potass by deflagration, and on inflammation leave little or no residuum. Bitumen in its various states is found in various parts of the world, in the Tauride, at Burmah, Zante, Barbadoes and Trinidad.

Sp. 1. NAPHTHA. It is nearly as colourless, transparent, and fluid as water. Specific gravity 0.729 to 0.847, of a highly penetrating, yet not disagreeable smell, somewhat like that of rectified oil of amber, very volatile, and remaining fluid at zero of Fahrenheit.

Sp. 2. PETROLEUM. Not so fluid, transparent, or colourless, as the former; smell less pleasant. Specific gravity 0.878.

Sp. 3. MINERAL TAR. Viscid; of a dark colour; smell sometimes strong, but often faint. Specific gravity 1.1.

Sp. 4. MINERAL PITCH.—Maltha. Brittle in cold weather; of a dark colour; opaque. Specific gravity probably 1.07.

Sp. 5. ASPHALTUM. Very brittle; fracture conchoidal; glassy lustre; no smell unless when melted or heated. Specific gravity 1.07 to 1.65. Fusible and inflammable.

According to Mr Kirwan and Mr Hatchett, the first species, by exposure to the air, and gradual decomposition, passes successively through the intermediate states, till at last it is converted into asphaltum. When partially decomposed, the remaining naphtha may be separated by distillation from the superabundant charcoal.

The first species is very rare. It is found in Persia and in the Dutchy of Modena. The second is the officinal article, and comes from Barbadoes and other tropical islands.

Medical use.—The Barbadoes tar is found in several of the West India islands, where it is highly esteemed by the inhabitants as a sudorific and in disorders of the breast and lungs; though in cases of this kind, attended with inflammation, it is certainly improper; they likewise apply it externally as a discutient, and for preventing paralytic disorders.

An oil extracted from a kind of stone coal has been extolled among the common people, under the name of British oil, for rheumatic pains, &c. The empyreumatic oil now obtained during the formation of coal gas, in such abundance that it is difficult to consume it, agrees in every respect with the native fluid bitumen, and by rectification it is rendered equally light, limpid and colourless as naphtha, for which it might be used as a substitute.

BOLETUS IGNIARIUS. *Ed.*

Cryptogamia, Fungi.—Nat. ord. *Fungi,* Linn., Juss.

Female agaric, or Agaric of the oak, called, from its being very easily inflammable, Touchwood or Spunk.

THIS fungus is indigenous, and is frequently met with on different kinds of trees, especially the cherry and plumb. The medullary part, beaten soft, and applied externally, has been much celebrated as a styptic, and said to restrain not only venous but arterial hæmorrhagies, without the use of ligatures. It does not appear, however, to have any real styptic power, or to act otherwise than dry lint, sponge, or any other soft, porous application. It is best when gathered in August or September.

It has been analysed by Bouillon Lagrange, who found it to contain, 1. An extractive matter soluble in water, sulphate of lime, and muriate of potass. 2. The residuum incinerated gave phosphates of lime, magnesia, and iron. 3. Alcohol extracted very little resin. The alkalies also indicated the presence of an animal matter, but in less quantity than in the boletus agaricus, which also differed in containing a free acid and much resin. But it probably consists chiefly of that highly azotized principle discovered by Braconnot, and called *Fungin.*

BONPLANDIA TRIFOLIATA. *Ed.*

CUSPARIA FEBRIFUGA. *Lond.*

Willd. *g. sp. Pentandria Monogynia.*—Ord. naturalis, *Rutaceæ,* Jussieu.

Off.—The bark, called Angustura bark.

CORTEX BONPLANDIÆ TRIFOLIATÆ. *Ed.*

CORTEX ANGUSTURÆ. *Dub.*

CORTEX CUSPARIÆ. *Lond.*

THE natural history of this bark was long but imperfectly known. It is now fully established by the travels of Humboldt, that it is the produce of South America. He gave to Willdenow a dried specimen of the tree of which it is the bark, and that eminent botanist discovered it to be a new genus, to which he gave the name of BONPLANDIA, in honour of Humboldt's botanical travelling companion. The London College, however, give this tree the name of Cusparia Febrifuga, derived from *Cuspa,* the native appellation of the tree; but this name should be abandoned, for although it was inserted by Humboldt in the chart belonging to his geography of plants, that of *Bonplandia Trifoliata* is adopted by him in his *Plantæ Æquinoctiales.* The name Angustura bark is derived from the Spanish denomination *cascarilla,* or *corteza del Angostura,* which is the vulgar name of the town of St Thomas, near the straits of the Orinoco, where it forms a considerable article of commerce.

The appearance of the bark varies, according as it has been taken from larger or smaller branches. It is only one or two lines in thickness, and is sometimes cracked externally. The outer surface is more or less wrinkled, and of a greyish colour, and the inner surface is of a dull brown. The bark of the younger branches is of a fine green colour, dotted with greyish tubercles. Its substance is of a yellowish-brown colour. Its fracture is short and resinous. Its taste is intensely bitter, and slightly aromatic, leaving a strong sense of heat and pungency in the throat and fauces. The odour is peculiar. The powder is yellow.

According to the experiments related by Mr Brande, from 3840 parts of angustura, there were extracted by alcohol, 144 of resin, and 300 of an acrid unctuous substance; the residuum yielded to water 1500 of dry gummy extract. Treated first with water, it gave 2110 grains of a clear brown extract, bitter, but not acrid, and afterwards 161 of a resin of a light brown colour, and extremely acrid. By distillation it gave 26 of essential oil. The tincture is of a deep yellow colour, reddens infusion of turnsole, and becomes turbid and white on admixture with water. By repeated filtration a brownish resin is separated, and the transparent fluid has a pale yellow colour. I find that it is not precipitated by solution of gelatin, but by infusion of galls, and it has the peculiar property of acquiring a deep red colour with red sulphate of iron, and depositing a purplish slate-coloured precipitate, remarkably different from what I have seen any other substance produce. Vauquelin says this precipitate is yellow; but in every other respect his analysis confirms mine. As it appears that the angustura of commerce is of different kinds, and often mixed, these experiments require to be repeated with genuine specimens.

Med. use.—As an aromatic bitter, it acts as a tonic and stimulant of the organs of digestion. It increases the appetite for food, removes flatulence and acidity arising from dyspepsia, and is a very effectual remedy in diarrhœa proceeding from weakness of the bowels, and in dysentery; and it possesses the singular advantage of not oppressing the stomach, as cinchona is apt to do. It does not cure intermittents.

It is exhibited,

1. In powder, in doses of from 5 to 20 grains, either alone or with rhubarb, magnesia, or carbonate of lime.
2. In infusion: the infusion of one drachm in four ounces of water may be used daily.
3. In tincture: one or two drachms in dyspepsia.
4. In watery extract. Humboldt informs us, that the Catalonian Capuchins, who possess the missions of Carony, prepare with great care an extract of this bark, which they distribute to the convents of Catalonia.

Dr Rambach of Hamburgh first observed poisonous effects from some angustura bark, and his observations have been fully confirmed by other accidents and by experiments on animals. The Austrian Government, on this account, ordered all the angustura bark in the kingdom to be destroyed, and interdicted its future importation; and other states have followed its example.

The spurious angustura belongs to the same class of poisons as the Faba Sti Ignatii, upas tieuté, &c.

The false or fine angustura, which is the bark of the *brucea antidysenterica*, has been more recently analyzed by Pelletan and Caventou. They have discovered in it a new alkali upon which its virulence depends, and to which they have given the name of *Brucea.* When obtained pure it crystallizes in oblique prisms, with parallelogram bases, or in talcy plates somewhat like boracic acid. It is soluble in 500 waters boiling, and in 850 cold. It is also soluble in alcohol, but not in sulphuric ether, in the fixed oils, and very little in the volatile oils. Its action on the living body is to produce tetanus, without affecting the intellectual faculties, in which respect it has a great analogy to *strychnia*, but it is only about one-twelfth of its strength. It forms salts and supersalts, with many acids, which are generally soluble.

BORAX. *Dub.* *See* SODÆ SUB-BORAS.

Bubon galbanum. *Ed. Dub. Lond.*

Willd. *g.* 546, *sp.* 2.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ,* Linn., Juss.

Off.—The gum resin called Galbanum.

Gummi resina bubonis galbani. *Ed.*
Galbanum; gummi resina. *Dub.*
Gummi resina galbani. *Lond.*

This plant is perennial, and grows in Africa. It abounds with a milky juice, which sometimes exudes from the joints of the old plants, but is more frequently obtained by cutting them across, some inches above the root. The juice which flows from the wound soon hardens, and is the galbanum which is brought to us from Syria and the Levant.

The best sort of galbanum consists of pale-coloured pieces, about the size of a hazel nut, which, on being broken, appear to be composed of clear white tears, of a bitterish acrid taste and a strong peculiar smell. But it most commonly occurs in agglutinated masses, composed of yellowish or reddish and clear white tears, which may be easily torn asunder, of the consistence of firm wax, softening by heat, and becoming brittle by cold, mixed with seeds and leaves. What is mixed with sand, earth, and other impurities, and is of a brown or blackish colour, interspersed with no white grains, of a weak smell, and of a consistence always soft, is bad.

Galbanum is almost entirely diffusible in water, but the solution is milky; nor does wine or vinegar dissolve it perfectly. It is not fusible, but furnishes a considerable proportion of essential oil when distilled with water. Neumann obtained from a pound of galbanum by distillation with water six drachms of oil, besides what remained dissolved in the water. The watery extract amounted to about three ounces. It was somewhat nauseous, but could not have been recognised as a preparation of galbanum. From the same quantity alcohol extracted upwards of nine ounces and a half of a hard, brittle, insipid, inodorous substance (resin?)

Medical use.—Galbanum agrees in virtue with gum ammoniacum; but is generally accounted less proper in asthmas, and more so in hysterical complaints. It is exhibited in the form of pills or emulsion, to the extent of about a drachm. Applied externally, it is supposed to resolve and discuss tumours, and to promote suppuration.

BUTEA FRONDOSA. *Dub.*

Willd. *sp. plant. t.* 3, *p.* 917. *Diadelphia Monogynia.*—Nat. ord. *Papilionaceæ,* Linn., *Leguminosæ,* sect. *Papilionaceæ,* Juss.

Leafy Butea.

Officinal.—Kino.

KINO. *Dub.*

I HAVE introduced this article, because the Dublin College have introduced it as furnishing the kino of the shops, though certainly erroneously; for Dr Roxburgh, whom they quote as their authority, distinctly mentions that the concrete juice which exudes from the maduga differs from kino. But it deserves further examination by a more practised chemist.

The *butea superba,* a very large twining shrub, yields a similar juice.

CAJUPUTI OLEUM. *Lond.* See MELALEUCA.

CALAMINA. *Lond. Dub.* See ZINCUM.

CALAMI RADIX. *Lond.* See ACORUS.

CALUMBA. *Lond.* See COLUMBO.

CALX, recens usta. *Dub. Ed.*

Quicklime recently burnt.

LIME is not found in nature uncombined, but it is easily prepared from any of its carbonates, either mineral or animal, by the action of fire, which first expels the water, then destroys any animal matters which may be present, and lastly expels the carbonic acid. This process is improperly termed the burning of lime. The product is lime, or, as it is commonly called, quicklime. In this state lime is of a grey-white colour, warm, acrid and urinous to the taste; sp. gr. 2.33, soluble in 777.7 times its weight of water. It is apyrous; it changes vegetable blues to green; it combines with all the acids, sulphur, sulphuretted hydrogen, and phosphorus; it is very abundant in the mineral kingdom, and forms the basis of animal bones and shells. The calcareous spars, marble, limestone, chalk and marl, consist chiefly of lime.

If about one-third of its weight of water be poured upon lime, a great increase of temperature takes place, steam is produced, and the lime crumbles down into a dry powder, increased in weight by the presence of part of the water which has been solidified by the lime: and to the caloric of fluidity, which is expelled during the conversion of the water into a solid, the great increase of the temperature is owing. Lime in this state is said to be slacked. If more water be poured upon slacked lime, there is no new evolution of caloric; but if the water amount to 800 times the weight of the lime, the lime is completely dissolved. The solution is termed Lime-water.

As lime quickly attracts moisture and carbonic acid from the atmosphere, it should be always recently prepared; and it should be preserved in very close bottles. It will also keep for a considerable time if covered with water. The crust of carbonate of lime formed preserves the lime below in a caustic state. Lime should not effervesce with acids, and should be entirely soluble in water.

Medical use.—On the living body lime acts as an escharotic, and as such it was formerly applied to ill-conditioned and obstinate sores. Dissolved in water, it is sometimes given internally as a tonic or astringent in scrofula and various fluxes, and formerly it enjoyed considerable reputation as a lithontriptic. It is extremely useful in removing the scabby crusts in tinea capitis.

CALCIS CARBONAS.
Carbonate of lime.

CARBONATE of lime is obtained from both the mineral and animal kingdoms. It is found under a great variety of forms, and has various names, as chalk, limestone, marble, spar. In form it is either amorphous, stalactical, or crystallised. When amorphous, its texture is either foliated, striated, granular, or earthy. The primitive form of its crystals is a rhomboidal parallelopiped. Hardness, lustre, and transparency, various: when transparent, it causes double refraction; specific gravity from 2.315 to 2.78; colour, when pure, white; effervesces briskly with muriatic acid, and dissolves in it entirely, or nearly so, forming a colourless solution.

The officinal varieties of mineral carbonate of lime are,

a) CRETA ALBA, Carbonas calcis mollior. *Ed.*
CRETA, Carbonas calcis friabilis. *Lond.*
CRETA, Carbonas calcis. *Dub.*
Soft carbonate of lime. Chalk.

b) MARMOR ALBUM, Carbonas calcis durior. *Ed.*
MARMOR ALBUM, Carbonas calcis dura. *Lond.*
Indurated carbonate of lime. Marble.

They contain about 45 parts of carbonic acid, and 55 of lime.

Carbonate of lime occurs in the animal kingdom in the shells and rudiments of shells of some of the crustaceous insects. Of these some are still officinal, *Crabs claws*, *Crabs stones*, vulgarly called crabs eyes, and *Oyster shells.*

c) CHELÆ CANCRORUM ex cancro paguro. *Ed.*
CHELÆ CANCRORUM. *Dub.*
Crabs claws from the black-clawed crab.

THE species of crab which furnishes this article inhabits the North Sea. Its claws are yellow, tipt with black.

They consist of carbonate of lime, combined with a little phosphate of lime and gelatine. The quantity of the two last is too small, and their action on the human body too inconsiderable, to make any considerable difference in medical properties between these concretions and carbonate of lime, as it occurs in the mineral kingdom.

d) LAPILLI CANCRORUM ex cancro astacho. *Ed.*
CALCULI CANCRORUM, Oculi dicti. *Dub.*

CRABS STONES are generally about the size of peas, or larger; somewhat hemispherical in their shape, and laminated in their texture; of a white colour, but sometimes reddish or bluish.

These concretions are found in the stomach of the craw-fish, one on each side, at the time when the animal changes its shell, which commonly happens in the month of August. The concretions afterwards gradually disappear, and none are found after the new shell has acquired its full degree of firmness. They therefore seem to furnish the materials for the induration of the new shell. They are brought in great numbers from Poland and Russia, especially from the province of Astracan, where the craw-fish are either bruised with wooden mallets, or laid up in heaps to putrefy, when the flesh is washed away with water, and the concretions picked out.

Crabs stones are said by most writers on the materia medica to be frequently counterfeited with tobacco-pipe clay, or compositions of chalk with mucilaginous substances. This piece of fraud, if really practised, may be very easily discovered: the counterfeits wanting the leafy texture, which is observed upon breaking the genuine; more readily imbibing water; adhering to the tongue; and dissolving in vinegar, or the stronger acids, diluted with water, either entirely or not at all, or by piece-meal; whilst the true crab stones, digested in these liquors, become soft and transparent, their original form remaining the same, as the organization of the gelatine is not altered by the acid.

e) TESTÆ ex ostrea eduli. *Lond.*
Oyster-shells.

THE oyster is a very nutritious article of diet, and in some diseases not only admissible, but even advantageous. Their shells, which are officinal, are composed, like all other mother-of-pearl shells, of alternate layers of carbonate of lime, and a thin membranous substance, which resembles coagulated albumen in its properties. By burning, this membrane is destroyed, and the shells are converted into very pure lime.

Medical use.—These varieties of carbonate of lime differ only in the compactness of their aggregation. The harder kinds are fitter for some pharmaceutical purposes, as for the gradual production of carbonic acid gas and solution in muriatic acid; while the friable varieties are fitter for medical use. Chalk and crabs stones are often exhibited internally to correct acidity of the stomach when accompanied by looseness; and prepared chalk forms an excellent application to scalds and burns and fetid ulcers, to absorb the serum and pus effused.

CAMBOGIA. *Lond.* See STALAGMITIS.

CAMPHORA ex lauro camphora. *Ed.*
CAMPHORA, concretum sui generis sublimatione paratum. *Lond.*
CAMPHORA, resina. *Dub.*
Camphor.

THE camphor laurel grows in great abundance, and to a very considerable size, in the forests of Japan. It is not uncommon in greenhouses in England. Every part of the tree smells strongly of camphor, which is obtained from the trunk, branches, and root, by sublimation. The wood is cut down into small pieces, and put into a still, with a proportion of water. After the water has been kept boiling forty-eight hours, the camphor is found adhering to the straw with which the head of the still is lined. In this state it is imported by the Dutch, and is called *crude camphor*. It is very impure, consisting of small brownish or dirty grey grains, mixed with straw, wood, hair, and other impurities. From these it is purified, in Holland, by a second sublimation in glass vessels; being previously mixed with quicklime, to combine with and prevent any empyreumatic oil with which it may be contaminated from subliming, while the camphor concretes in the upper part of the vessel into cakes, convex on the one side, and concave on the other, about two or three inches thick, thinner at the edges, and generally perforated in the middle.

Pure camphor is lighter than water, very white, pellucid, somewhat unctuous to the touch, brittle, yet tough and elastic, so as to be scarcely pulverizable; shining in its fracture, and crystalline in its texture; of a bitterish, aromatic, pungent taste, yet accompanied with a sense of coolness, of a strong and very penetrating smell; very volatile, inflammable, burning entirely away, without leaving any coal or ashes; capable of combining with the resins and balsams, soluble in alcohol, ether, fixed and volatile oils, and the concentrated sulphuric, nitric, muriatic and acetic acids, and in ammonia; separable from these alcoholic and acid solutions by water; insoluble in water, alkalies, and the weaker acids; decomposed by heat, when mixed with alumina, into an essential oil and charcoal; and by treating it with a sufficient quantity of nitric acid, forming a portion of camphoric acid; and, with sulphuric acid, artificial tannin.

But the production of camphor is not confined to the laurus camphora, although it furnishes almost all the camphor of commerce; it is found in very great purity in interstices among the woody fibres of the *Dryabalanops camphora* of Borneo and Sumatra. This variety is highly esteemed by the Chinese, and brings a very high price. It is much denser than common camphor, being heavier than water, in semitranslucent tables, like fused boracic acid, ringing when shaked, and not subliming and condensing in crystals in the upper part of the bottle. From the same tree is also obtained, in considerable quantity, a limpid fluid, sp. gr. 0.887, smelling like oil of juniper, but becoming milky by agitation with water, from the separation of camphor? which rises to the surface; becoming milky when agitated with alcohol or sulphuric ether, but on standing subsiding from them in a limpid state. This is not much esteemed. For specimens of both solid and fluid camphor of Borneo, I am indebted to John Crawford, Esq. resident at Sincapore. Camphor is also contained in the roots of the laurus cinnamomum, alpinia galanga, amomum zedoaria, &c.; in the seeds of the amomum cardamomum, piper cubeba, &c.; and in many indigenous plants, as in the thymus serpyllum and vulgaris, juniperus communis, rosmarinus officinalis, salvia officinalis, mentha piperita, &c. and it may be separated from the essential oils of rosemary, lavender, marjoram, and sage.

An artificial camphor, differing from common camphor, in not being soluble in weak nitric acid, nor being precipitated by water from its solution in strong nitric acid, may also be prepared, by directing a stream of muriatic acid gas into oil of turpentine. Camphor is now universally considered to be a peculiar vegetable principle, and not a resin, as incorrectly stated by the Dublin College.

Medical use.—Camphor is a very active substance, when taken into the stomach. It increases the heat of the body considerably, and gives a tendency to diaphoresis, but without quickening the pulse. At first it raises the spirits, but produces a subsequent depression. In excessive doses it causes syncope, anxiety, retchings, convulsions and delirium. These violent effects of camphor are most effectually counteracted by opium.

In a morbid state of the body, camphor allays inordinate actions. When the pulse is hard and contracted, it renders it fuller and softer. It removes spasms, and flitting pains arising from spasms; and in delirium, when opium fails of procuring sleep, camphor will often succeed. It is also said to correct the bad effects of opium, mezereon, cantharides, and the drastic purgatives and diuretics.

The most general indication for the use of camphor is the languor or oppression of the *vis vitæ*. It may therefore be given with advantage.

1. In all febrile diseases of the typhoid kind, especially when attended with delirium.
2. In inflammations with typhoid fever, as in some cases of peripneumonia and rheumatism.
3. In eruptive diseases, to favour the eruption, or to bring it back to the skin, if from any cause it has suddenly receded, as in small-pox, measles, &c.
4. In many spasmodic diseases, especially mania, melancholy, epilespy, hysteria, chorea, hiccough, &c.

5. In indolent local inflammations, not depending upon an internal cause, to excite action in that part.

As, from its great lightness, it is apt to swim upon the contents of the stomach, and to occasion pain at its upper orifice, it is necessary that it be always exhibited in a state of minute division. In order to reduce it to powder, it must be previously moistened with a little alcohol. It may then be given,

1. In powder, with sugar, magnesia, and nitrate of potass.
2. In pills, with the fetid gums and mucilage.
3. In solution, in alcohol, oil, or acetic acid.
4. Suspended in the form of an emulsion, by means of wheat, starch, mucilage, sugar, yolk of egg, almonds, vinegar, &c.

Internally, it may be given in small doses, of from one to five grains, repeated at short intervals, as its effects are very transient; or in large doses, of 20 grains and upwards.

CANCER. *Dub.* See CALX.

CANELLA ALBA. *Lond. Ed. Dub.*

Willd. *g.* 942, *sp.* 1.—*Dodecandria Monogynia.*—Nat. ord. *Oleraceæ*, Linn., *Meliaceæ*, Juss.

Canella alba.

Off.—The bark.

CORTEX CANELLÆ ALBÆ. *Ed.*
CORTEX CANELLÆ. *Lond.*
CANELLA ALBA. *Dub.*

THE canella alba is a tall tree, which is very common in Jamaica, and other West-India islands.

The canella is the interior bark, dried in the shade, after being freed from the epidermis, which is thin and rough. There are two sorts of canella in the shops, differing from each other in the length and thickness of the quills; they are both the bark of the same tree, the thicker being taken from the trunk, and the thinner from the branches.

It was introduced into Europe, according to Clusius, in 1605, and is brought to us rolled up in long quills, or flat pieces, thicker than cinnamon, and both outwardly and inwardly of a whitish colour, slightly inclining to yellow. It is a warm pungent aromatic, and in distillation with water it yields a large proportion of a very active volatile oil, of a yellow or rather reddish colour, and of a sweet odour, approaching to that of cinnamon. It must not be confounded with Winter's bark, the product of the *Drymis Winteri.*

Medical use.—Canella alba is sometimes employed where a warm stimulant to the stomach is necessary. In America it is considered to be a powerful antiscorbutic. It is also added as a corrigent to other medicines.

CANTHARIS VESICATORIA. *Ed.*
CANTHARIS. *Cantharis vesicatoria,* Latreille. *Lond.*
MELOE VESICATORIUS. *Dub.*
Insecta Cleoptera, Vesicantia. Syst. Nat. Gmelin, g. 2013.
Spanish fly. Blistering fly.
Off.—The insect.
LYTTA. *Lond.*
CANTHARIS VESICATORIA. *Ed.*
CANTHARIS. *Dub.*

THESE insects have a longish, green, and gold-shining body, with flexible green striped elytera, which cover the whole back of the body, and conceal brown membranous wings. On their head they have two black articulated feelers. They are found on the fraxinus, sambucus, salix, ligustrum, &c. in Spain, Italy, France, and Germany. The largest come from Italy, but the Spanish cantharides are preferred. They are gathered by shaking the trees on which they are, and catching them on a cloth spread beneath it. They are then killed by the fumes of vinegar, and dried carefully in a stove. The *melolontha vitis* is sometimes found mixed in considerable numbers with the cantharides. They are easily distinguished by their almost square body; and as they do not stimulate the skin, they should be picked out before the cantharides are powdered. In the East Indies the *Meloë trianthema* is used as a substitute.

Neumann got from 1920 grains, 920 watery, and afterwards 28 alcoholic extract; and inversely, 400 alcoholic, and 192 watery. Lewis ascertained that their active constituent is entirely soluble, both in water and in alcohol; for extracts made with each of these solvents blistered, as far as could be judged, equally, and as effectually as cantharides in substance. Both the residua were inactive. Thouvenel considered the vesicating power to reside in a green matter of an oily nature. Beaupoil in two substances, one yellow and the other black, both soluble in water, but separable by alcohol. Lastly, Robiquet, in a very detailed analysis, says, that neither of these three principles blisters of itself; but that this property resides essentially in a particular white crystalline substance, soluble in warm alcohol, separating as it cools, in small scaly crystals, soluble in ether and oils, and insoluble in water, to which Dr Thomson has given the name of *Cantharidin.* He also found free acetic acid, phosphate of magnesia, a reddish-yellow oil insoluble in alcohol, and, lastly, uric acid.

Medical use.—Cantharides have a peculiar nauseous smell, and an extremely acrid burning taste. Taken internally, they often occasion a discharge of blood by urine, with exquisite pain. If the dose be considerable, they seem to inflame and ulcerate the whole intestinal canal; the stools become mucous and purulent; the breath fetid and cadaverous; intense pains are felt in the lower belly; the patient faints, grows giddy, delirious, and dies. Applied to the skin, they first inflame, and afterwards excoriate the part, raising a more perfect blister than any of the acrid vegetables, and occasioning a more plentiful discharge of serum; but even the external application of cantharides is often followed by a strangury, accompanied with thirst and feverish heat.

The inconveniences arising from the use of cantharides, whether taken internally, or applied externally, are best obviated by drinking plentifully of bland emollient liquids, such as milk, emulsions, &c. The specific property of counteracting cantharides ascribed to camphor is much disputed.

The internal use of cantharides is at all times doubtful, and requires the most prudent management. They have, however, been sometimes employed with success in dropsy, and in diseases of the urinary organs, arising from debility, especially gleet and leucorrhœa. They are given in substance, in very small doses, or in tincture.

Applied externally, they are one of our best and most powerful remedies. By proper management, they may be regulated so as to act as a gentle stimulus, as a rubefacient, or as a blister.

Blisters are applied,

1. To increase the activity of the system in general, by means of their irritation;
2. To increase the activity of a particular organ;
3. To diminish morbid action in particular organs, by means of the irritation which they excite in the parts to which they are applied.

They may be employed with advantage in almost all diseases accompanied with typhoid fever, especially if any important viscus, as the brains, lungs, or liver, be at the same time particularly affected. In these cases, the blisters cannot be applied to the diseased organs themselves, but as near them as may be convenient. When we wish to excite action in any organ, the blisters are, if possible, applied directly to the diseased organ.

CAPSICUM ANNUUM. *Ed. Dub. Lond.*

Willd. *g.* 384, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ,* Linn. Juss.

Cockspur pepper.

Off.—The fruit or berry.

FRUCTUS CAPSICI ANNUI. *Ed.*
FRUCTUS CAPSICI. *Dub.*
BACCÆ CAPSICI. *Lond.*

THIS is an annual plant, a native of South America, cultivated in large quantities in our West-India islands, and even frequently in our gardens, for the beauty of its pods.

The pods of this species are long, pointed, and pendulous, at first of a green colour, and, when ripe, of a bright orange red. They are filled with a dry loose pulp, and contain many small, flat, kidney-shaped seeds. The taste of Capsicum is extremely pungent and acrimonious, setting the mouth, as it were, on fire.

The principle on which its pungency depends, I find, is soluble in water and in alcohol, is not volatile, reddens infusion of turnsole, and is precipitated by infusion of galls, nitrate of mercury, muriate of mercury, nitrate of silver, sulphate of copper, sulphate of zinc, red sulphate of iron, (but the precipitate is neither blue nor green,) ammonia, carbonate of potass, and alum, but not by sulphuric, nitric, or muriatic acid, or silicized potass.

Cayenne pepper is an indiscriminate mixture of the powder of the dried pods of many species of capsicum, but especially of the *capsicum frutescens,* or bird pepper, which is the hottest of all. Cayenne pepper, as it comes to us in powder from the West Indies, changes infusion of turnsole to a beautiful green, probably owing to the muriate of soda, which is always added to it, and to red oxide of lead, with which it is said to be adulterated.

Medical use.—These peppers have been chiefly used as a condiment. They prevent flatulence from vegetable food, and have a warm and kindly effect on the stomach, possessing all the virtues of the oriental spices, without, according to Dr Wright, producing those complaints in the head which the latter are apt to occasion. An abuse of them, however, is supposed to produce visceral obstructions, especially of the liver. In the practice of medicine, they constitute one of the simplest and strongest stimulants; their action not being followed by any narcotic effects. Dr Wright says, that in dropsical and other complaints, where chalybeates are indicated, a minute portion of powdered capsicum forms an excellent addition; and he recommends its use in lethargic affections. It has also been successfully employed as a gargle in cynanche maligna, when it has resisted the use of cinchona, wine, and the other remedies commonly employed; and it is frequently used in relaxed sore throats. Coma and delirium are commonly attendants of tropical fevers; and in such cases, cataplasms of capsicum have a speedy and happy effect. They redden the parts, but seldom blister, unless when kept on too long. In ophthalmia from relaxation, the diluted juice of capsicum is a sovereign remedy. Dr Adair gave in cachexia Africana six or eight grains for a dose, made into pills; or he prepared a tincture, by digesting half an ounce of the pepper in a pound of alcohol, the dose of which was one or two drachms diluted with water.

CARBO LIGNI RECENS, s. s. Carbo ligni. *Lond.*
CARBO LIGNI. *Ed. Dub.*

Charcoal of wood.

CARBON, in a state of great purity and extreme aggregation, is the well-known precious mineral the *diamond.* It possesses a very high degree of lustre, transparency, hardness, and refractive power. It is crystallized and generally colourless. Its specific gravity is about 3.5. It is insoluble in water, and can neither be melted nor vaporized by caloric. It is a non-conductor of electricity. It is not acted upon by any chemical agent, except oxygen, at very high temperatures, when it undergoes combustion.

Plumbago and incombustible coal are native varieties of carbon in a state of less aggregation, and somewhat impure. In the former, it is combined with a little iron; in the latter with earthy matter. The most remarkable peculiarity of these substances is the very high temperature necessary for their combustion.

Common charcoal of wood is another, and the most common form of carbon. It is obtained by exposing wood to a high temperature without the free contact of air, or, as it is called, by destructive distillation, in close vessels. It then appears in the form of solid masses, of a black colour, and more than twice as heavy as water, as is evident from the manner in which it sinks, although it is stated in chemical books as lighter than water. It has neither smell nor taste. It is brittle, and never crystallized; it rapidly attracts moisture, so as to acquire an increase of from 12 to 14 *per cent.* of weight. When dry, it also absorbs several times its bulk of any gas in which it is placed. It absorbs light strongly, is refractory in the fire, insoluble in water, and a bad conductor of caloric, but an excellent one of electricity. In vacuo, and in gases on which it has no action, it is slowly volatilized by the highest power of galvanism. At a red heat it burns rapidly in oxygen gas, and the product is carbonic acid gas, which is exactly equal in volume to the oxygen consumed; by weight the proportions are 27.27 and 72.72. It also burns in atmospheric air, but less vividly. Common charcoal always furnishes a little water on its combustion, but charcoal from the decomposition of oil gives carbonic acid alone.

Carbon combines with iron, forming steel. It is a constituent of almost all animal and vegetable substances; and is obtained from them by exposing them to heat in close vessels.

There are several varieties of charcoal used in medicine or pharmacy.

I. Vegetable charcoals.
  a. Dense; from the charring of oak, beech, and other hard woods.
  b. Gritty; from bread.
  c. Light; from willow and vine twigs.
  d. Saline; from fuci, æthiops vegetabile.
  e. Wood soot—fuligo ligni.
  f. Oil soot—lamp black.
II. Animal charcoal.
  a. Burnt bones—ivory black.
  b. Cuttle-fish bone.
  c. Burnt sponge.
III. Mineral charcoal.
  a. Coke.

Charcoal, especially animal charcoal, was found by Lowitz to possess the remarkable property of absorbing and then removing certain adventitious colours and smells from animal and vegetable matters, and hence they have become valuable means for purifying vegetable principles, and for checking and correcting putrescency.

Charcoal, as it is commonly prepared, is not a pure carbon, but contains also a notable proportion of hydrogen, from which it may be purified by exposing it for some time to a strong heat. Munch directs, that for medical use it be reduced to fine powder, and heated in a covered crucible, as long as any flame appears on removing the cover, and until it be fully red. It is then to be allowed to cool in the furnace, the upper layer of the powder to be removed, and the remainder to be sealed accurately up in ounce vials.

The Paris Pharmacopœia has given a formula for preparing charcoal. They direct that to charcoal of lime-tree, willow, poplar, or any other light wood, thoroughly burnt, very light, ringing and pure, water be added, but not more than to moisten it; and that it be then pounded in an iron mortar, or ground in a mill, so as to make a soft fluid mass, which is to be left at rest for some days, and then put upon a linen cloth that the water may be removed. Of this paste round cakes are to be made, which are to be exposed to the rays of the sun to be thoroughly dried. It is added in a note, that by the insolation a singular efficacy is imparted to the charcoal, which that dried in the shade does not possess in an equal degree, as thus any adventitious colour and all smell are entirely removed.

For pharmaceutic purposes, such as depriving morphia, sulphate of quinia, and the other vegetable principles of foreign colouring matter, animal charcoal, or ivory black, from which the earthy part has been removed by treating it with dilute muriatic acid, and afterwards by alkaline ley, is by far the most efficacious.

Medical use.—From its acknowledged effects in correcting the putrescency of animal matters, charcoal has been employed to destroy the fœtor of privies, and especially those of camps and hospitals, where dysentery prevails. With the same view, it is applied to gangrenous and fœtid ulcers, porrigo, and in all cases of putrescent secretions. Charcoal, especially that of vine twigs, or of the cuttle-fish bone, is the basis of most of the empyrical dentifrices; and its virtue in correcting fœtid breath from carious teeth is well established. Even in the stomach, it is probable that it exerts the same chemical action, and that it is capable of correcting the putrid eructations in some cases of dyspepsia, against which it has been recommended in ten grain doses. Taken in larger quantity, as a table-spoonful, two or three times a-day, with syrup of roses, it is said to remove habitual costiveness. Dr Jackson gave it in half-drachm doses with excellent effect in dysentery. Charcoal was recommended as a specific in ague by Dr Calcagno of Palermo, and it was much used by our medical officers in Sicily. They gave a scruple every two hours, drinking after each dose four ounces of water acidulated with sulphuric acid.

When the pneumatic pathology was in fashion, and phthisis and similar diseases were ascribed to hyper-oxygenation of the system, charcoal was strongly recommended as a powerful disoxygenizing remedy, and cases of its successful employment are even recorded.

CARDAMINE PRATENSIS. *Ed. Dub. Lond.*

Willd. *g.* 1257, *sp.* 19. Smith, *Flor. Brit. g.* 304, *sp.* 4. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ*, Linn., *Cruciferæ*, sect. *Sisymbriæ*, Juss.

Meadow ladies smock. Cuckow flower.

Off.—The flowers.

FLORES CARDAMINES. *Lond.*

FLOS CARDAMINES. *Dub.*

FLORES CARDAMINES PRATENSIS. *Ed.*

LADIES SMOCK is an indigenous perennial plant, which grows in meadow grounds, and produces purplish flowers in the spring. In its sensible qualities it resembles the *sisymbrium nasturtium.*

Medical use.—Long ago it was employed as a diuretic; and it has been again introduced in nervous diseases, as epilepsy, hysteria, chorea, asthma, &c. A drachm or two of the powder is given twice or thrice a-day. It has little sensible operation, except that it sometimes acts as a diaphoretic.

CARDAMOMUM. *Dub.* See AMOMUM.

CARDUUS BENEDICTUS. *Dub.* See CHIRONIA.

CARICA. *Dub.* See FICUS.

CARUM CARUI. *Ed. Dub. Lond.*

Willd. *g.* 561, *sp.* 1.—Smith, *Flor. Brit. g.* 152, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Common caraway.

Officinal.—The seeds.
Semina carui. *Dub. Lond.*
Semina cari carui. *Ed.*

Caraway is a biennial umbelliferous plant, cultivated in our gardens, both for culinary and medicinal use. The seeds have an aromatic smell, and warm pungent taste, and yield much essential oil.

Med. use.—They are employed as stomachic and carminative in flatulent colics.

Caryophylli. *Lond. Dub.* See Eugenia.

Caryophyllum rubrum. *Dub.* See Dianthus.

Cascarilla. *Dub. Lond.* See Croton.

Cassia *.

Willd. *g.* 813. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ,* Linn., *Leguminosæ,* sect. *Papilionaceæ,* Juss.

Sp. 18. Cassia fistula. *Ed. Dub. Lond.*
Cassia tree.

Off.—The fruit and its pulp.
Pulpa cassiæ. Lomentorum pulpa. *Lond.*
Pulpa fructus cassiæ fistularis. *Dub.*
Fructus cassiæ fistulæ. *Ed.*

This tree is indigenous in India and Egypt, and is cultivated in Jamaica. It rises to about thirty feet high, and has long flower spikes, with yellow papilionaceous blossoms.

Its fruit is a cylindrical pod, scarcely an inch in diameter, a foot or more in length; the outside is a hard brown bark, the valves of botanists; the inside is divided by thin transverse woody plates, *dissepimenta,* covered with a soft black pulp, of a sweetish taste, with some degree of acrimony. There are two sorts of this drug in the shops; one brought from the East Indies, the other from the West (Cassia Javanica?) The canes or pods of the latter are generally large, rough, thick-rinded, and the pulp nauseous; those of the former are smaller, smoother, the pulp blacker and of a sweeter taste, and are preferred to the other. Such pods should be chosen as are heavy and new, and do not make a rattling noise, from the seeds being loose within them, when shaken. The pulp should be of a bright, shining, black colour, and have a sweet taste, neither harsh, which happens from the fruit being gathered before it be fully ripe, nor sourish, which it is apt to become upon keeping, nor at all mouldy, which is frequently the case from its being kept in damp cellars, or moistened, in order to increase its weight. Greatest part of the pulp dissolves both in water and in alcohol, and may be extracted from the pod by either. The shops boil the bruised pod in water, and afterwards evaporate the solution to a due consistence.

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* My friend, Dr Colladon of Geneva, published at Montpelier, in 1816, a most valuable monography of the very extensive genus *Cassia,* in writing which he enjoyed the assistance of Decandolle.

Vauquelin has analyzed this pulp, and found it to consist of parenchyme, gluten, gelatin, gum, extractive and uncrystallizable sugar.

Med. use.—The pulp of cassia, from its saccharine and extractive constituents, is a gentle laxative medicine, and is recommended, in a dose of some drachms, in costive habits. Some direct a dose of two ounces, or more, as a cathartic, in inflammatory cases, where the more acrid purgatives are improper; but in these large quantities it generally excites nausea, produces flatulence, and sometimes gripings of the bowels, especially if the cassia be not of a very good kind: these effects may be prevented by the addition of aromatics, and by exhibiting it in a fluid form.

Sp. 24. CASSIA SENNA. *Ed. Lond. Dub.*

Senna.

Off.—The leaves, or rather folioles.

FOLIA CASSIÆ SENNA. *Ed.*

FOLIA SENNÆ. *Lond. Dub.*

FROM Egypt, under the title of Senna leaves, the leaves, mixed with the pods, of two species of cassia, are exported; viz. of the *Cassia lanceolata* and *C. obovata*, both natives of Egypt and the neighbouring countries. Both are small shrubs, almost herbaceous, with pinnated leaves, but easily distinguished by the form of the folioles from which they derive their name. Those of the lanceolata are most esteemed. They are of an oblong figure, sharp-pointed at the ends, about a quarter of an inch broad, and not a full inch in length, unequally divided by the middle rib, without prominent lateral fibres, of a lively yellowish-green colour, a faint, not very disagreeable smell, and a sub-acrid, bitterish, nauseous taste. Some inferior sorts are brought from other places: these may be easily distinguished by their being either narrower, longer, and sharper-pointed, brought from Mocha: or large and obtuse, of a fresh green colour, without any yellow cast, from Tripoli, *C. obovata.*

With the true sennas are mixed the leaves of another plant, a native of the same district, the *Cynanchum arguel.* These are leaves, and are regular at the base; whereas the folioles of the senna are always oblique. Rouillion says that at Cairo the traders mix them in the proportions of 500 of pointed senna, 300 of obovata, and 200 of arguel.

When they reach Europe they are still further adulterated by the admixture of the folioles of the *Colutea arborescens,* which are very like the obovate senna, but are perfectly symmetrical, not oblique.

But the greater part of the senna now used in this country is of a different kind: the folioles are more acute and longer than those of the lanceolate senna of Egypt. It is called East Indian; but according to Lemaire Lisancourt, it is the product of a species of senna which grows on the west coast of Africa, from the Isle of Goree to Sierra Leone, and over all Senegambia, and to which he has given the name of *Cassia elongata.* In America they now use the folioles of the *Cassia Marylandica.*

Senna leaves have been analyzed by MM. Lassaigne and Feneulle. Ether extracted a green tincture, but elevated nothing on distillation, and left a residuum of chlorophylle and a greasy oil. Water distilled from senna became milky, and acquired its peculiar smell. The decoction was of a reddish yellow, and had a bitter taste, with uncombined acid. It was precipitated by acetate of lead, which carried down malic acid and some colouring matter. The liquor was treated with sulphuretted hydrogen to separate all lead, and evaporated to dryness, and redissolved in alcohol, which left a little mucus and colouring matter. It was again evaporated to the consistence of an extract, and treated with alcohol, acidulated with sulphuric acid, to separate some acetate of potass, and the sulphate of potass formed was separated by filtration. The sulphuric acid added in excess was precipitated by acetate of lead, the lead removed by sulphuretted hydrogen, and the liquor finally evaporated to dryness. To the substance obtained by this process, these chemists have given the name of *Cathartin,* considering it to be the purgative principle of the senna, as in small doses it purges with slight colic pains. Cathartin is not crystallizable, is deliquescent, has a reddish yellow colour, a peculiar smell, a bitter nauseous taste, is soluble in all proportions in alcohol and water, insoluble in ether. Its watery solution is precipitated in yellowish flocculi by infusion of galls and subacetate of lead. It is not precipitated by sugar of lead, iodine, tartar emetic, or gelatin. Its colour is destroyed by chlorine, and deepened by the alkalies; and it is rendered brown by persulphate of iron. It did not yield ammonia by destructive distillation. The rest of the analysis is less important in relation to medicine; but the result of the whole was, that senna leaves consisted of 1 chlorophylle, 2 greasy oil, 3 volatile oil in small quantity, 4 albumen, 5 cathartin, 6 yellow colouring principle, 7 mucus, 8 malic acid, 9 malate and tartrate of lime, 10 acetate of potass, 11 mineral salts.

Medical use.—Senna is a very useful cathartic, operating mildly, and yet effectually; and, if judiciously dosed and managed, rarely occasioning the bad consequences which too frequently follow the exhibition of the stronger purges. The only inconveniences complained of in this drug are, its being apt to gripe, and its nauseous flavour. These are best obviated by adding to the senna some aromatic substance, as cardamom, ginger, cinnamon, &c. and by facilitating its operation by drinking plentifully of any mild diluent.

Senna may be given in substance to the extent of about a drachm, but this is rather too bulky, and it is therefore better to divide it into two doses, and to take one half at night, and the other in the morning. It is more conveniently given in the form of infusion, which is generally made by pouring about six ounces of boiling water upon from two to six drachms of senna leaves in a tea-pot, and letting it stand about an hour. Senna ought never to be ordered in decoction, Gren says, because it becomes perfectly inert, from the total dissipation of the nauseous and volatile principles on which its purgative effects depend. It has been customary to reject the pedicles of the leaves of senna, as causing gripes and pains in the bowels; but this is a mere prejudice, for both leaves and pedicles act in the very same way.

The tincture, on account of the menstruum, cannot be given in doses large enough to purge.

CASSIÆ CORTEX. *Dub.* See LAURUS.

CASTOR FIBER. *Ed. Dub.* CASTOR FIBER ROSSICUS. *Lond.*

Mammalia Rodentia, Cuvier.

The beaver.

Off.—Castor, a substance collected in follicles near the anus.

Castoreum. *Ed.*

a) Castoreum rossicum. *Dub.*

Castoreum, concretum sui generis. *Lond.*

b) Castoreum canadense. *Dub.*

The beaver is an amphibious quadruped, strongly characterised by its flat, horizontal, scaly tail. It is found in the northern parts of Europe, Asia, and America, on the banks of lakes and rivers. In inhabited countries it is a solitary slothful animal, but in desert regions it lives in society. Their remarkable manners in this state, and the immense works effected by the united labours of the individuals of their republic, have rendered the natural history of this animal familiar to every one. In both sexes, between the anus and pudendum, there are four follicles, of an oblong shape, smaller above, and larger below, formed of a tough membrane, almost resembling leather. The two largest and undermost of these, which are also connected, and lie parallel and close to each other, contain an oily fluid secretion, which is the substance known by the name of Castor. It is preserved by cutting out the entire bags, and drying them in the smoke.

The best castor comes from Russia, Prussia, and Poland. The cods should be dry, gibbous, roundish, heavy, solid, and filled with a solid substance contained in membranous cells, somewhat tough, but brittle, of a dark brown colour, of a peculiar disagreeable, narcotic smell, and a nauseous, bitter, acrid taste. The Canadian castor is of an inferior quality; the cods are smaller, thin, oblong, and much corrugated, and the castor itself has much less smell and taste: what is very old, quite black, and almost destitute of smell and taste, is unfit for use, as well as the counterfeited castor, which is a mixture of various gummy resins and other substances, with a little real castor, artificially interspersed with membranes, and stuffed into the scrotum of a goat. This imposition is easily detected, by the weaker degree of its smell and taste, by chemical analysis, and even by mere external examination; for to the real bags, the two smaller and upper follicles, filled with the fatty matter, are always attached.

Bouillon Lagrange found it to be composed of a resin, adipocere, volatile oil and extractive; and Laugier discovered benzoic acid in it. Borm of Amsterdam analysed fresh castor, and found it to consist of one-third of volatile oil, one-half of adipocere, and a little resin; one-sixth of membrane, and one-fourth of carbonate of lime. It lost by drying 40 *per cent.* The essential oil therefore seems either to be dissipated by drying, or converted into resin by the absorption of oxygen.

Med. use.—Castor is an excellent antispasmodic. It is very little heating, and acts particularly on the uterine system.

It is given with advantage,

1. In typhoid fevers.
2. In spasmodic diseases, especially in hysteria and epilepsy, and in cases of difficult parturition, from a spasmodic contraction of the mouth of the uterus after the membranes have burst.
3. In amenorrhœa.

It is exhibited most advantageously in the form of powder, in doses of from 10 to 20 grains, and in clysters, to a drachm. Diluted alcohol extracts its virtues; therefore it may be also given in the form of tincture. But its exhibition in the form of extract or decoction is improper.

CATECHU. *Lond. Dub.* See ACACIA.

CENTAUREA BENEDICTA. *Ed. Dub.*

Willd. *g.* 1548, *sp.* 89. *Syngenesia Polygamia frustanea.*—Nat. Ord. *Compositæ capitatæ,* Linn., *Synantheræ,* sect. *Carduaceæ,* Juss.

Blessed Thistle.

Off.—The leaves or plant.

HERBA CENTAUREÆ BENEDICTÆ. *Ed.*

FOLIA CARDUI BENEDICTI. *Dub.*

THIS is an annual plant, indigenous in the Grecian islands, and cultivated in our gardens. The leaves have a penetrating bitter taste, not very strong or very durable, accompanied with an ungrateful flavour, from which they are in a great measure freed by keeping. Water extracts, in a little time, even without heat, the lighter and more grateful bitter; but if the digestion be continued for some hours, the disagreeable parts are taken up. A strong decoction is very nauseous and offensive to the stomach. Rectified spirits acquire a very pleasant bitter taste, which remains uninjured in the extract.

Med. use.—This plant is now little employed. The nauseous decoction is sometimes used to provoke vomiting, and a strong infusion to promote the operation of other emetics. But good effects have been frequently experienced from a slight infusion of carduus, in loss of appetite, where the stomach was injured by irregularities. A stronger infusion, made in cold or warm water, if drunk freely, and the patient kept warm, occasions a plentiful sweat, and promotes the secretions in general.

An extract prepared by evaporating the expressed juice, with the addition of a little alcohol, to prevent it from becoming mouldy, has been strongly recommended in the catarrh of children.

The seeds of this plant are also considerably bitter, and have been sometimes used with the same intention as the leaves.

CENTAURIUM. *Lond. Dub.* See CHIRONIA.

CEPA. *Dub.* See ALLIUM.

CERA FLAVA. *Ed. Lond. Dub.*

Yellow wax.

FOR this useful substance we are indebted to the common honey bee *(apis mellifica,)* an insect belonging to the class of *Hymenoptera mellita* of Cuvier. Wax is, however, a vegetable production, and is collected by the bees from the surface of leaves, and the antheræ of flowers. They employ it to form the combs in which the honey and larvæ are deposited.

It is found in the shops in round cakes, which are formed by melting the combs in hot water, after all the honey has been expressed from them. The wax swims above, and the impurities either sink to the bottom, or are dissolved in the water. When recent, it is tenacious, but brittle, of a yellow colour, and sweet honey-like smell; dry, not greasy, to the feel; insoluble in water, and in cold alcohol, or ether; soluble in boiling alcohol and ether, in the fat oils and alkalies; fusible and inflammable. In selecting it, we should observe that the cakes be brittle, have a pleasant yellow colour, and agreeable smell, no taste, do not adhere to the teeth when chewed, and burn entirely away. When adulterated with resin, the fraud is detected by its taste, and the action of cold alcohol, which dissolves the resin. When mixed with pease-meal or earthy substances, it is more brittle, of a paler colour, and may be separated from them by liquefaction and straining. When combined with tallow, it becomes less brittle, and softer, and has an unpleasant smell.

CERA ALBA. *Lond. Ed. Dub.*

White wax.

THE yellow colour of bees wax, and its peculiar smell, may be destroyed by the combined action of water, air, and the sun's rays. In the process of bleaching wax, we therefore extend its surface as much as possible, by melting it, and forming it into thin plates, which are fully exposed to the sun's rays, upon linen stretched in frames, and repeatedly moistened until they acquire the whiteness desired. It is then usually melted into thin discs. White wax is more brittle, less fusible, and heavier than yellow wax. It is sometimes mixed with white oxide of lead, or with tallow. For medical use, it has no advantage over yellow wax. It is worthy of notice, that the white wax bleached in Britain has much less tenacity than the foreign; and hence dentists import from Hamburgh the wax they use for taking impressions of the gums, for making artificial teeth.

Professor John first shewed that wax consisted of two principles, one soluble in alcohol, which he called *Cerin*, and one insoluble, *Myricin*. His experiments were confirmed and extended by Bucholz and Brandes, who have given the following contrasted view of their properties :

	Cerin.	*Myricin.*
When extracted by alcohol, ...	Almost Colourless	Dirty White.
After being melted, ...	Yellowish White	Brownish Yellow.
Smell, ...	Weak Waxy	Ditto.
Consistence, ...	Waxy	Softer.
Sp. gr.	0.969	1.000.
Solubility in boiling absolute alcohol,	$\frac{1}{16}$	$\frac{1}{122.6}$
Deposited on cooling, ...	Gelatinous	Distinct flocculi.
Solubility in absolute ether, ...	$\frac{1}{41.6}$	$\frac{1}{99}$
Time of melting, ...	as 4 to	3.

Medical use.—When taken internally, wax seems to agree in its effects with the fat oils, and though less frequently prescribed in this way, it is preferable, being less apt to become rancid. Poerner recommends it as an excellent remedy in diseases of the intestines, attended with pain, excoriation, and obstinate diarrhœa. He gave a scruple, or half a drachm of wax, three or four times a-day, in the form of an emulsion, by melting it first with some fixed oil, and then mixing it with a decoction of groats, by trituration with the yolk of an egg. But its principal use is in the formation of cerates, ointments, plasters, &c.

CEREVISIÆ FERMENTUM. *Lond. Ed.*

Barm or yeast.

BARM or yeast has lately been much extolled as an antiseptic remedy in putrid fevers. A table spoonful is recommended to be given as a dose, in porter, or wine and water. It is also applied externally, in the form of a poultice, to foul and putrid sores.

CERUSSA. *Dub.* See PLUMBUM.

CERVUS ELAPHUS. *Ed. Dub. Lond.*
Mammalia ruminantia.
The stag, or hart.
Off.—The horns.
CORNU CERVI ELAPHI. *Ed.*
CORNU CERVINUM. *Dub.*
CORNUA. *Lond.*

THE male has two round solid horns on his forehead, with several conical branches, the number of which ascertains the age of the animal to which they belong. These horns fall off, and are renewed every year. When first produced, they are soft, full of blood vessels, and covered with velvety skin; but they soon lose their covering, and become hard, compact, and bony.

In their nature, they do not seem to differ from bone, except in containing a large proportion of cartilage. They afford a very considerable quantity of gelatin, by decoction with water, and hartshorn shavings are still employed in domestic economy, for furnishing a nutritious and demulcent jelly. By the action of fire, their products are the same with those of animal substances in general; and they were formerly so much used for the preparation of ammonia, that it was commonly called Salt or Spirit of Hartshorn. By burning, they are totally converted into phosphate of lime.

CHIRONIA CENTAURIUM. *Ed. Dub. Lond.*

Willd. *g.* 394, *sp.* 9. Smith, *Flor. Brit. g.* 102. *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Rotaceæ,* Linn., *Gentianeæ,* Juss.

Smaller centaury.
Off.—The flowering heads.
SUMMITATES CHIRONIÆ CENTAURII. *Ed.*
CACUMINA CENTAURII. *Lond.*
CACUMINA FLORENTIA CENTAURII MINORIS. *Dub.*

This plant is annual, and grows wild in many parts of England on barren pastures. It flowers between June and August. It is a pure bitter, and agrees in every respect with other species of Gentian.

Neumann got from 480 parts 210 alcoholic, and 140 watery extract, and inversely 320 watery, and 40 alcoholic.

CICUTA. *Dub.* See CONIUM.

CINCHONA.

Willd. *g.* 346. *Pentandria Monogynia.*—Nat. ord. *Contortæ*, Linn., *Rubiaceæ*, Juss.

Sp. 1. CINCHONA OFFICINALIS. *Dub.*
Sp. CINCHONA CORDIFOLIA. *Lond. Ed.*
Sp. CINCHONA LANCIFOLIA. *Lond. Ed.*
Sp. CINCHONA OBLONGIFOLIA. *Lond. Ed.*

Off.—The bark, commonly called *Peruvian bark*, of which there are three officinal varieties, the *pale*, the *yellow*, and the *red*.

CORTEX PERUVIANUS. *Dub.*
a) CORTEX COMMUNIS CINCHONÆ.
CORTEX CINCHONÆ LANCIFOLIÆ. *Lond. Ed.*
b) CORTEX FLAVUS CINCHONÆ.
CORTEX CINCHONÆ CORDIFOLIÆ. *Lond. Ed.*
c) CORTEX RUBER CINCHONÆ.
CORTEX CINCHONÆ OBLONGIFOLIÆ. *Lond. Ed.*

THE history of the discovery of the febrifuge powers of Cinchona is uncertain. In Loxa there is no document to illustrate it, and there is no probability that the Jesuits learned its use from the natives, as they obstinately retain their customs like the natives of Hindostan; and although fever is very common among them, they would rather die than take cinchona, which they class, with opiates, among the poisons causing gangrene. There is an old tradition in Loxa, that the Jesuits used to distinguish the different kinds of trees by chewing their bark, and were attracted by the great bitterness of the cinchona; and as among their missionaries there were always some acquainted with medicine, the story that they tried an infusion of it in the endemic fever of the country is not improbable. The appellation *Pulvis Comitissæ* seems to be even older than *Pulvis Jesuiticus* or *Pulvis Patrum*; and there was a Count Cinchona Viceroy in Lima from 1629 to 1639, whose Countess, said to have been cured of fever by it, on her return to Spain in 1640 probably first made it known in Europe.

From 1638 to 1776 no other cinchona occurred in commerce except that of Loxa and the neighbouring district. La Condamine mentions the cinchona of Riobamba and Cuença in the province of Quito, as well as that of Ayavaca and Jaen de Bracamorros. In 1753 Don Miguel de Santisteban, in travelling from Loxa to Santa Fé de Bagota by Popayan, observed that every where at the same elevation with Loxa there were cinchona trees. From him, in 1761, Mutis received the first specimen of *C. cordifolia.* Mutis, in 1772, found cinchona near Santa Fé, and sent it to Europe from Carthagena. Till then all the cinchona was gathered in the woods of Loxa, Ayavaca and Jaen de Bracomorros, and shipped under the name of *Cascarilla fina de Uritasinga,* at Payta, to double Cape Horn. In 1776 Don F. Renquifo discovered the *C. nitida* of Ruiz at Huanuco. Ruiz and Pavon, authors of the *Flora Peruviana,* examined the valleys of the tributaries of the Amazon river, and almost at the same time cinchona was found in the northern and southern extremities of South America, in the mountains of Santa Martha, and in the kingdom of Buenos Ayres, at La Paz and Cochabamba. Since 1780 Europe has received cinchona of different value from Payta, Guayaquil, Lima, Buenos Ayres, Carthagena and Santa Martha.

Cinchona, considered as a genus, is a mountainous tree, never found in the plains, and growing between the height of 1282 and 975 toises above the level of the sea. It grows to a great height, and formerly its trunk was often thicker than a man's body. But since its bark has come into such general use, few trees are to be seen thicker than the arm. Indeed, there is reason to fear that it will become still more scarce, as no attention is paid to its cultivation, and the trees always die after being stripped of their bark. This operation is performed in the dry season from September to November. The bark is then carefully dried in the sun, and packed in skins, which contain from 100 to 150 pounds, and are called by the Spaniards *zeronne.* In these, coarse and fine pieces of the same kind of bark are promiscuously mixed, but they are afterwards sorted. Humboldt says, that from 12 to 14,000 quintals are annually exported. 2000 are exported from Carthagena, and come from the kingdom of Santa Fé. Loxa furnished, previous to 1779, 4000 quintals, but now only 110, which are sent to Spain on account of the king. The rest is furnished by the provinces of Huamanga, Cuenço, Jaen de Bracamorros, &c. and are exported from Lima and other parts of the Pacific Ocean.

The genus cinchona is naturally subdivided into those species whose corolla is hairy and those whose corolla is perfectly smooth, and the barks of all the species included in the first division are febrifuge. They are the Condaminea, Lancifolia, Cordifolia, Oblongifolia, Ovalifolia, Brasiliensis and Excelsa.

The following information concerning the species of cinchona which furnish the officinal varieties of Peruvian bark, is from Humboldt's account of the cinchona forests in South America.

C. Condaminea, corollæ tubo hirto, foliis ovato-lanceolatis utrinque glaberrimis, in axillis nervorum inferne scrobiculatis. Humboldt and Bonpland. It furnishes the *Cascarilla fina* or superior bark of Uritasinga, which has always been considered in Spain as the most efficacious in the cure of tertian, and is now only collected for the king's apothecary, and therefore cannot occur in commerce legally. It grows exclusively in the neighbourhood of Loxa, in 4° south lat. at a height between 900 and 1200 toises, and in a somewhat milder climate than *C. lancifolia,* having a medium temperature of 65 to 70 Fahr., or nearly that of the Canary Islands.

Cinchona lancifolia, foliis lanceolatis acutis utrinque glaberrimis, Mutis; known in Santa Fé by the appellation of *Quina Naranjada* or Orange china. It loves a raw climate. It grows between the 4th and 5th degree of north latitude, on the declivity of hills, and between the heights of 700 to 1500 toises. The medium temperature of the situation is about that of Rome, or 60 F.; but the trees in the highest places are generally exposed to a temperature of 50 or 55. In these alpine forests the cold often sinks for an hour to the freezing point, but no snow falls in this latitude below 1500 toises. This species is rare. While the *cordifolia* and *oblongifolia* form in some places in Santa Fé continued thickets, the *lancifolia* always stands alone, and is more difficultly propagated by suckers. The synonyms of this species are the *C. angustifolia* of Ruiz, *C. nitida*, Flor. Peruv., and *C. lanceolata,* Flor. Peruv.

Cinchona cordifolia, foliis orbiculato-ovatis, sæpe subcordatis, subtus tormentosis, supra pubescentibus, Mutis. Var β. foliis vix cordatis utrinque glabris. Var. γ. foliis utrinque hirsutis. *Quina amarilla,* or Yellow China of Santa Fé. It grows in north lat. 4°, at a height between 900 and 1440 toises. It is identical with the *C. pubescens* of Vahl, and also with *C. ovata*, Flor. Peruv., the *Cascarilla pallida* of Ruiz; and presents varieties in *C. hirsuta*, Flor. Peruv., and *C. tenuis*, Ruiz; and perhaps in *C. purpurea*, Ruiz.

C. oblongifolia, foliis oblongis, acuminatis, glabris, filamentis brevissimis, antheris infra medium tubi latentibus. Red China of Santa Fé. It grows in 5° north lat. at a height between 600 and 1300 toises, and is particularly common near the town Mariquita in New Grenada. It is identical with *C. magnifolia*, Flor. Peruv., and the *Cascarilla amarilla* of the Quinologia.

Three kinds of cinchona bark are found in commerce in this country.

1. *Pale Bark.*—In commerce, we have several varieties of the common pale bark, the most remarkable of which are, the quilled bark, which comes from Loxa, and the flat bark, from Guanaco.

The bark which comes from Loxa consists of thin, singly or doubly rolled pieces, four or five inches long, and scarcely a line in thickness; externally rough, of a greyish brown colour, and generally covered with a kind of lichen; internally of a cinnamon colour. Its fracture should not be fibrous or powdery, but even and shining. It has a peculiar aromatic smell, and a pleasant bitter astringent taste. In commerce it is known by the name of *Crown Bark.*

The bark which comes from Guanaco consists of much thicker, coarser, and flatter pieces; externally of a dark brown or almost black colour, but internally it has the same cinnamon colour; and in its resinous fracture, smell, and taste, it exactly resembles the former. When genuine, both varieties are excellent remedies.

2. *Yellow Bark.*—Yellow bark consists of pieces about six inches in length, thicker, and less rolled up than the common bark. Its internal surface is of a deeper red. It sometimes wants the epidermis, which is often as thick as the bark itself. It is lighter and more friable than the former variety; its fracture is fibrous; and when reduced to powder, its colour is paler. Its taste is much more bitter, astringent, and stronger; but its smell is weaker. Its decoction, when hot, is redder; but when cold, paler. Its solution strikes a deeper colour with sulphate of iron. It contains less gum than the common, and less resin than the red bark. It is said to be much more powerful than either; according to Mutis, it is the only one which is directly febrifuge; and we are informed by Humboldt, it is that which is most

esteemed at Loxa, and known by the name of *Cascarilla fina.*

3. *Red Bark.*—It occurs generally in much larger, thicker, flatter pieces, but sometimes also in the form of quills. It is heavy, firm, sound, and dry; friable between the teeth; does not separate into fibres; and breaks, not shivery but short, close, and smooth. It has three layers: the outer is thin, rugged, of a reddish brown colour, but frequently covered with mossy matter; the middle is thicker, more compact, darker coloured, very resinous, brittle, and yields first to the pestle: the inmost is more woody, fibrous, and of a brighter red. Its powder is reddish, like that of Armenian bole. Its astringency and bitterness are more intense, and it contains more resin than the pale bark. It is not, however, allowed by Mutis to be, like the yellow bark, directly febrifuge. It is said to be more frequently adulterated.

There is still some uncertainty as to the botanical species which affords each of the varieties of Peruvian bark found in commerce; and I expect, with much anxiety, the Pharmalogical Monography, now publishing by M. von Bergen at Hamburgh, of which I have seen the admirable coloured plates. In the meantime, as Humboldt deposited, in the Museum of the *Jardin des Plantes,* authentic drawings and specimens of all the species, it will perhaps not be considered superfluous to transcribe the description of the officinal cinchonas from the Pharmacopœia Gallica.

“ CINCHONA officinalis, L.—Cinchona Condaminea, Humb. Bonpl. —Cortex Peruvianus. Off.—Kinakina cinericia.—*Le* QUINQUINA *gris de Loxa.*

Cortex crassitie nunc calami scriptorii, nunc digiti, varius, tectus epidermide cinericiâ, rugosâ, transversis fissuris et interdùm lichene minimo deturpata; idem intùs ex fulvo ferrugineus, in fractura lævi fuscus ac quasi resinosus; astringens, amarus, non intermixto mucaginis sapore, et cujus amarities, non illicò, verùm ubi salivâ subactus est, in ore evolvitur; odore sub-aromaticus.

CINCHONA ovalifolia, Mutis.—Cinchona macrocarpa, Vahl.—*Le* QUINQUINA *blanc.*

Cortex ut in officinali, pallidior tamen, extùs magis cinericius; sapore saponaceo, summè amaro, non astringente.

CINCHONA lancifolia, Mutis.—Cinchona nitida. R. P.—*Le* QUINQUINA *orangé.*

Cortex latus, intùs fulvus, epidermide tectus fuscâ, rugosâ, fissuris transversis; sub-aromaticus, summè amarus, ad Cinchonæ luteæ saporem accedens.

CINCHONA cordifolia, Mutis.—Cinchona pubescens, Vahl.—Cinchona micrantha, R. P.—*Le QUINQUINA jaune* ou *Jaune royal* ou *Calisaya.*

Cortex latus complanatus aut variè convolutus, nunc tectus epidermide in laminas seu crustas solubili, nunc extùs rasus et sulcis transversis exaratus, texturâ densus subfibratus, colore luteo-fulvus, sapore valdè amarus et astringens, vix odorus.

CINCHONA oblongifolia, Mutis.—Cinchona magnifolia, R. P. — *Le QUINQUINA rouge.*

Cortex crassus, fibratus, plùs minùsve ruber, amarus, summè astringens, epidermide tectus crassâ rugosâ fissuris in plurimos sensus distinctâ."

The great price of cinchona bark has sometimes tempted dishonest men to adulterate it with other similar and less powerful barks, and, what is equally blameable, with genuine bark, from which the active constituents have been entirely extracted, by decoction with water.

In selecting cinchona bark, we must therefore take care, that besides the characteristics already noticed, it be dense, heavy, and dry, not musty, or spoiled by moisture, and that a decoction made of it have a reddish colour when warm, but when cold become paler, and deposite a reddish sediment. Those pieces whose taste is simply intensely bitter or very astringent, or nauseous, or merely mucilaginous, whose surface is smooth or polished, of a dark colour, or pale yellow, or red, which are tough or spongy, whose fracture is fibrous, woody or powdery, and their internal colour white or grey, are to be rejected. It is still more difficult to know genuine cinchona bark in the form of powder. Indeed it is said that it is scarcely possible to meet with genuine powder of cinchona; for it cannot be rendered sufficiently fine by means of a pestle and mortar; and when an apothecary is even at the trouble to select good bark, and sends it to a bark-mill, he must depend upon the accuracy of many individuals for receiving back the very article he sent.

There are few vegetable substances which have been subjected to analysis more frequently, and by abler chemists, than the cinchona bark. But from the difficulty of the subject, and from essential differences in the chemical properties of several varieties confounded under one denomination, contradictory results have arisen, and our knowledge of the subject was still imperfect, until 1821, when MM. Pelletier and Caventou made cinchona and some congenerous barks the subject of the most perfect specimen of vegetable analysis which has ever appeared.

The earlier experiments were, as usual, directed to ascertain the quantity of soluble matter in different menstrua. Dr Irving obtained from cinchona a small portion of volatile oil, on which its aroma depends. Fabbroni observed, that cinchona loses its solubility by long exposure to the air, and even by being reduced to very fine powder; 100 parts of cinchona, when bruised, yielding from 12 to 16 of extract, and when finely powdered only 6 or 7. Dr Lewis observed, that the decoction became turbid on cooling, and that the precipitate was soluble in alcohol. He also pointed out the deep green colour which decoctions of cinchona acquire from the addition of chalybeates. Dr Irving afterwards found, that recent decoctions gave a black colour, while those which had been kept some time gave a green. It was long believed that cinchona was a powerful astringent; but after Seguin's discovery of gelatin as a test of the principle of astringency, Dr Maton found that cinchona contained very little tannin.

Deschamps obtained from yellow bark a considerable quantity of a saline matter, which was afterwards ascertained by Vauquelin to consist of lime and a new acid to which he has given the name of *Kinic acid*; but as this would lead us to suppose that it was obtained from Kino, it appears to me that it ought to be named *Cinchonic acid*, from the systematic name of the tree, from whose bark it has been first obtained *.

Dr Maton discovered and published, in some of the medical journals, that infusion of cinchona was precipitated by infusion of nut-galls. Seguin, who afterwards made the same observation, concluded from it that cinchona contained gelatin; and he and some other French and Italian physicians, believing the febrifuge virtue of cinchona to reside in gelatin, gave clarified glue in intermittent fevers as a substitute. M. Seguin's opinion appeared to me highly improbable; and I published in Nicholson's Journal, in 1803, some experiments, which sufficiently proved that cinchona does not contain gelatin. Infusion of galls was precipitated copiously, not only by the filtered decoction of cinchona, but also by the infusion and tincture diluted and filtered; and as these phenomena were inconsistent with the properties of gelatin or starch, (the only other principles which, were then known to precipitate infusion of galls,) I conceived myself authorised to ascribe them to a distinct vegetable principle, not hitherto examined, soluble in alcohol and in water, and called it *Cinchonin* *.

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* This suggestion has been before the public since 1808, and has been noticed by Dr A. T. Thomson in his deservedly popular London Dispensatory; but Mr Brande must have been unacquainted with his having been so long anticipated, in a matter, indeed, of little importance, when, in 1825, he thought it worth while to add, as a foot note upon *Kinic acid*, in his Manual of Pharmacy, "This appellation so associates itself in the mind with Kino, that I should suggest Cinchonic acid as preferable."

Dr Gomez prosecuted the subject with success, and first separated cinchonin in a crystalline form, and has described its properties in a state of tolerable purity. His general conclusions were, 1*mo*, That the crystals are a pure vegetable principle. This appears from the regular and crystalline form which they assume, from their complete solubility in sulphuric acid, and from the precipitate which potassa forms in this solution having the same properties as the crystals. 2*do*, That this pure principle is the cinchonin of Dr Duncan, since it gives, with the infusion of galls, a white precipitate capable of being dissolved by alcohol. 3*tio*, That this principle, in its insolubility in water, its inflammability and solubility in alcohol and ether, bears some analogy to resin, but differs from it by its crystallization and solubility in the acids. 4*to*, That by these last properties it is somewhat analogous to camphor, from which it differs, however, in being without odour, in being precipitated crystallized from the alcoholic solution; in having greater specific gravity, since it sinks in water; in giving a precipitate with the infusion of galls, &c. 5*to*, That, by having singular and peculiar properties, it is, as Dr Duncan thought, a vegetable principle different from all others hitherto known."

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* These experiments were overlooked by chemists in general. M. Gomez was, however, induced by them to prosecute the subject; and in the Transactions of the Royal Academy of Lisbon, he published a very able memoir, in which he pointed out the method of procuring cinchonin, and ascertained many of its properties and combinations. A very imperfect abstract of M. Gomez's memoir was published in the Annales de Chimie, and the translator suppressed those passages in which M. Gomez himself did me ample justice. In consequence of this, the French and other chemists ascribed to M. Gomez the discovery of a peculiar vegetable principle in cinchona, and the distinguishing it, by a proper name, cinchonin. I certainly did regret that I was thus deprived of the honour of having my name associated with those of the distinguished chemists who have at last rendered the subject one of great and general interest; and I took an opportunity of writing to M. Pelletier, who has, in the handsomest manner, publicly, in the *Journal de Pharmacie*, admitted the justice of my claims.

Another remarkable property of some kinds of cinchona, that of precipitating tartar-emetic, was discovered by Cornette, who found that an infusion of one ounce of cinchona decomposed one scruple of tartar-emetic, and was entirely deprived of its colour and bitter taste, while the antimonial lost its emetic property; but, according to Fabbroni, the cinchona preserved its febrifuge virtues.

Vauquelin, in a more recent examination of various cinchona barks, has shewn that there are three, if not four classes of cinchona bark, differing essentially in chemical constitution: but unfortunately he has not been able to designate, with botanical accuracy, the individuals he found to belong to each.

The first class precipitate astringents, but not gelatin.

The second precipitate gelatin, but not astringents.

The third precipitate both astringents and gelatin. And,

Lastly, some barks confounded with these precipitate neither astringents nor gelatin; but these, Vauquelin, viewing the genus chemically, does not consider as cinchonas.

M. Seguin, it appears, has now seen his error in supposing that cinchona contained gelatin, though without retracting it, and has published two additional memoirs upon cinchona, in which he says, that hitherto apothecaries had only the external appearance, fracture, taste, and smell to enable them to judge of the quality of cinchona; but that these characters are insufficient, and that it is only by means of chemical tests that we can ascertain the presence or proportion of the febrifuge principle. He gives with confidence the following criterions:

1. Cinchona, if good, precipitates the solution of tannn, but not those of gelatin or of sulphate of iron.

2. The precipitate which the febrifuge principle forms with the solution of tan is reddish, slightly flocculent, and heavy. If the precipitate be considerable and sink quickly, it is a proof that the febrifuge principle is abundant and of good quality. If it be not very decided, and remain suspended in the liquor, only disturbing its transparency, it is a proof that it is scanty and of bad quality.

3. If it does not precipitate the solution of tannin, it is a proof that it does not contain any febrifuge principle.

The application of these tests he describes as easy. He powders a drachm of cinchona, infuses it for half an hour in two ounces of boiling water, decants and filters the infusion. The solution of tannin is prepared by mixing two ounces with three ounces of cold water, and filtering it. A solution of nut-galls may be substituted, but it is rather too delicate. The solution of gelatin is made by dissolving an ounce of fine glue in three ounces of water in a sand bath, and filtering it through fine linen; the solution of sulphate of iron, by dissolving an ounce in two ounces of water. A little of the infusion of cinchona is put into a glass, and the re-agents added drop by drop.

The analysis of the various cinchona barks has been completed by MM. Pelletier and Caventou. They have ascertained the real nature of cinchonia, and have found it to be one of those substances lately discovered in the vegetable kingdom, which possess certain properties of alkalies, and upon which their peculiar virtues chiefly depend. To obtain it in a state of purity, they form a tincture of the pale bark *(Cinchona condaminea)* in boiling alcohol; distil off the alcohol to dryness; dissolve the extract in water strongly acidulated with muriatic acid; add to the solution calcined magnesia in abundance, and boil a few minutes; wash the precipitates repeatedly with cold water; subject it to the action of boiling alcohol, and evaporate the tincture, which furnishes cinchonia in acicular crystals.

Cinchonia is white, transparent, crystallizable; soluble in 700 cold waters; soluble in alcohol and acids, forming with some of them crystallizable salts. Its elementary principles are carbon, hydrogen and oxygen.

Quinia, another alkaloid, which differs from cinchonia as potass does from soda, is obtained by the same process from the yellow bark *(Cinchona cordifolia.)* It is white, not crystallizable, but forms amorphous transparent plates. It is less insoluble in water, and the salts it forms with acids are different.

The red bark *(Cinchona oblongifolia)* contains both these alkaloids, which exist in combination with an excess of the cinchonic acid discovered by Vauquelin.

Clinical experiments first made by MM. Double, Chomel and Villermet, and since repeated by many practitioners as well as myself, have established that these alkaloids are eminently febrifuge, and constitute in fact the febrifuge principle of the true cinchona barks.

The other principles, found in the cinchona barks, whose properties have been ascertained by MM. Pelletier and Caventou, are,

1. An unctuous matter, obtained separate by M. Lambert, by means of sulphuric ether. It is very soluble in ether even cold; soluble in boiling alcohol, partly deposited on

cooling, and forms a soap with alkalies. When got from pale bark it has a green colour, probably owing to the presence of a little *chlorophylle ;* from the other barks it is not green.

2. Cinchonic red of M. Reuss ; without taste or smell ; of a brown red colour ; soluble in considerable quantity in alcohol, especially warm ; little acted on by ether ; soluble in small quantity in boiling water ; very soluble in concentrated acetic acid, but separated by dilution ; neither alone nor combined with an acid, precipitating gelatin ; precipitating tartar emetic ; very soluble in cold alkaline fluids, and having its colour greatly deepened ; precipitated from its alkaline solutions by acids, but modified, as it now precipitates gelatine.

3. A soluble red matter, a variety of the tanning principle, which precipitates gelatin and starch, and gives a green colour to red salts of iron. The much greater solubility of the tannate of starch, at an increased temperature, is the cause of the decoction of bark turning turbid on cooling.

4. A yellow colouring principle, possessed of no remarkable properties.

5. Cinchonic acid, (kinic acid of Vauquelin,) united partly to the alkaloid, and partly to lime.

6. Starch.

7. Lignin.

MM. Pelletier and Caventou consider it impossible to give a *quantitative* analysis of so complex a substance as cinchona bark ; but they observe,

1. That the salifiable base exists in less quantity in the pale than in the yellow bark, as they got only two grammes of cinchonia from the kiligramme of the former, and nine grammes of quinia from the latter.

2. That the quilled red bark contains both salifiable bases in much greater quantity than either of the others, as a kiligramme yielded eight grammes of cinchonia and seventeen grammes of quinia.

3. That the cinchonic red seems identical in all the varieties. It is most abundant in the red, and least in the pale bark.

4. That the tanning principle is less abundant in the yellow than in the pale or red, and differs a little in each.

5. That gum is found in the pale bark only.

6. That the cinchonate of lime and other principles seems identical in all.

Medical use.—On dead animal matter cinchona bark acts as an antiseptic; and on the living body it acts moreover as a stimulant, tonic, and antispasmodic.

On its first introduction into Europe, it was reprobated by many eminent physicians; and at different periods long after, it was considered as a dangerous remedy; but its character, in process of time, became universally established, and at one time it was thought so indispensable to the cure of many diseases, that the British Government was accused of barbarity in preventing their enemies from getting it. Now, by one of those singular revolutions to which human opinion is liable, it has again fallen into great disuse.

It was first introduced for the cure of intermittent fevers; and these, when it is properly exhibited, it rarely fails to cure. Humboldt says, that in intermittent fevers, the bark of the *C. condaminea* and *C. lancifolia* are preferable to the others; while in diseases of the muscles and purulent ulcers *C. oblongifolia* is more fitted, and the milder *C. cordifolia* is adapted for convalescents. There has also been considerable difference of opinion with regard to the best mode of exhibition; some prefer giving it just before the fit, some during the fit, others immediately after it. Some, again, order repeated doses between the fits; and this mode of exhibition, although it may perhaps sometimes lead to the employment of more bark than is necessary, upon the whole appears preferable, from being best suited to most stomachs. The requisite quantity is very different in different cases; and in many vernal intermittents, cinchona seems even hardly necessary.

It is now given from the very commencement of the disease, without previous evacuations, which, by retarding the cure, often seem to induce abdominal inflammations, scirrhus, jaundice, hectic, dropsy, &c.; symptoms formerly imputed to the premature or immoderate use of the bark, but which are best obviated by its early and liberal use. It is to be continued not only till the paroxysms cease, but till the natural appetite, strength, and complexion return. It is then to be gradually left off, and repeated at proper intervals to secure against a relapse; to which there often seems to be a peculiar disposition, especially when the wind blows from the east. Although, however, evacuations rather counteract the effects of cinchona in the cure of intermittents, yet previous to its use, it is advisable to empty the alimentary canal, particularly the stomach; and on this account good effects are often obtained from premising an emetic.

It is a medicine which seems not only suited to both formed and latent intermittents, but to that state of fibre on which all periodical diseases seem to depend; as periodical pain, inflammation, hæmorrhagy, spasm, cough, loss of external sense, &c.

Cinchona was at one time used by some in all continued fevers; at the same time attention was paid to keep the bowels clean, and to promote when necessary the evacuation of redundant bile, always, however, so as to weaken the patient as little as possible. Now it is scarcely ever given, and the cure is entirely antiphlogistic.

In confluent small-pox, it promotes languid eruption and suppuration, diminishes the fever, and prevents or corrects putrescence and gangrene.

Dr Haygarth has extolled its use in acute rheumatism, from the very commencement, even without premising venesection.

In gangrenous sore throats, and indeed in every species of gangrene, it is much used, both externally and internally.

In contagious dysentery, after due evacuation, it has been used, taken internally and by injection, with and without opium.

In all those hæmorrhagies called passive, and likewise in other increased discharges, it is much used; and in certain undefined cases of hæmoptysis, some allege that it is remarkably effectual when joined with an absorbent.

It is used for obviating the disposition to nervous and convulsive diseases; and some have great confidence in it, joined with sulphuric acid, in cases of phthisis, scrofula, ill-conditioned ulcers, rickets, scurvy, and in states of convalescence. In these cases, it is proper to conjoin it with a milk diet.

In dropsy, not depending on any particular local affection, it is often alternated or conjoined with diuretics or other evacuants; and by its early exhibition after the water is once drawn off, or even begins to be freely discharged, a fresh accumulation is prevented, and a radical cure obtained.

Mr Pearson of the Lock Hospital praises very highly the powers of this remedy in different forms of the venereal disease; in reducing incipient bubo, in cleansing and healing ulcers of the tonsils, and in curing gangrenous ulcers from a venereal cause. But in all these cases mercury must also be given to eradicate the venereal virus from the system.

Peruvian bark may be exhibited,

1. In substance.

The best form of exhibiting this valuable remedy is in the state of a very fine powder, in doses of from ten grains to two drachms and upwards. Mutis and Zea say, that two drachms of true yellow bark in powder are sufficient to prevent the access of an intermittent, while, to produce the same effect, it requires the decoction of two ounces. As it cannot be swallowed in the form of a dry powder, it must either be diffused in some liquid, as water, wine, or milk, or mixed with some viscid substance, as currant jelly. Its taste, which is disagreeable to many people, is best avoided by taking it immediately after it is mixed with the vehicle. In this respect, therefore, it is better for the patients to mix it up themselves, than to receive it from the apothecary already made up, into a draught with some simple distilled water, or into an electuary with a syrup. A much more important objection to giving cinchona in substance is, that some stomachs will not bear it, from the oppression, and even vomiting, which in these cases it excites. We must endeavour to obviate this inconvenience by the addition of some aromatic, and by giving it in small doses more frequently repeated.

2. In infusion.

To those whose stomachs will not bear the powder, this is the best form of exhibiting cinchona bark. Water at a given temperature seems capable of dissolving only a certain quantity of its active constituents, and therefore we are not able to increase the strength of an infusion, either by employing a larger quantity of the bark, or allowing them to remain longer in contact. One part of bark is sufficient to saturate sixteen of water in the course of an hour or two. To accelerate the action of the water, it is usual to pour it boiling hot upon the bark, to cover it up, and allow it to cool slowly. After standing a sufficient length of time, the infusion is decanted off for use. The infusion in water is however liable to one very great objection, that it cannot be kept even a very short time without being decomposed and spoiled.

3. In decoction.

Water of the temperature of 212° is capable of dissolving a much larger proportion of some of the principles of cinchona bark than water at 60°. But the solvent powers even of boiling water have their limits, and by protracting the decoction we do not increase its strength, but rather, by diminishing the quantity of the menstruum, we lessen the quantity of matter dissolved. Besides, at a boiling temperature, some of the active constituents are dissipated, while others absorb oxygen rapidly from the atmosphere, and are converted into what seems to be an insoluble and inert substance.

4. In tincture.

The great activity of the menstruum in this preparation, prevents the bark from being given in sufficiently large doses to exert its peculiar virtues. It is, however, a powerful tonic.

5. In some instances, we prepare the infusion with wine; and it fortunately happens that very often the use of the menstruum is as much indicated as that of the solvend. Cinchona also prevents wine from becoming acid, but in the course of a few days throws down its colouring matter, as nut-galls and charcoal do.

6. In extract.

In this preparation, we might expect to possess the virtues of cinchona bark in a very concentrated state. The principal objections to its use are its great expense, and the decomposition and destruction of the active constituents of the bark during the preparation, even when most carefully conducted. Not above half the weight of the dry extract is again soluble in water. It is convenient for the formation of pills and boluses, but we would always prefer a fresh infusion or decoction to any mixture in which the extract is redissolved.

Externally, cinchona bark is used in substance, as an application to ill-conditioned, carious, or gangrenous ulcers.

In the form of clyster it may be given in substance, decoction, or extract. The powder is used as a tooth powder for spongy and bleeding gums, and the decoction is an excellent astringent gargle or wash.

To increase the power of cinchona bark, or to direct its efficacy to a particular purpose, or to correct some inconveniences occasionally produced by it, it is frequently combined with other remedies. When it produces vomiting, carbonic acid forms a useful addition; when it purges, opium; when it oppresses the stomach, aromatics; and when it induces costiveness, rhubarb. But we are afraid that many additions are made, chiefly saline substances, of which the effects are not at all understood. Sulphuric acid, super-sulphate of alumina and potass (alum,) muriate of ammonia, carbonate of potass, tartrate of potass, tartrate of antimony and potass (tartar-emetic,) iron, lime-water, astringents, &c. have been frequently prescribed with it; but we know that in many of these mixtures decomposition occurs, which renders the whole either inactive, or completely deceives us with regard to the expected effects.

CINERES CLAVELLATI. *Dub.* See POTASSA.

CINNAMOMI CORTEX ET OLEUM. *Lond.* See LAURUS.

CITRUS.

Willd. *g.* 1391. *Polyadelphia Icosandria.*—Nat. ord. *Pomaceæ*, Linn., *Aurentiaceæ*, Juss.

Sp. 2. CITRUS AURANTIUM. *Ed. Var.* Hispalense. *Lond. Dub.*

Seville orange.

Off.—The fruit, juice and rind of the fruit, unripe fruit, and distilled water of the flowers.

a) BACCÆ AURANTII. *Lond.*
 SUCCUS CITRI AURANTII. Fructus succus. *Ed.*
 SUCCUS FRUCTUS AURANTII HISPALENSIS. *Dub.*
b) CORTEX CITRI AURANTII. Cortex exterior fructus. *Ed.*
 CORTEX AURANTII; baccarum cortex exterior. *Lond.*
 EPIDERMIS FRUCTUS AURANTII HISPALENSIS. *Dub.*
c) FRUCTUS IMMATURUS AURANTII HISPALENSIS. *Dub.*
d) AQUA STILLATITIA FLORUM AURANTII HISPALENSIS. *Dub.*

THE orange tree is a beautiful evergreen, a native of Asia, but now abundantly cultivated in the southern parts of Europe, and in the West-India islands. There are many varieties of this species, but they may be all referred to the Bitter or Seville orange, and the Sweet or China orange.

The juice of oranges is a grateful acid liquor, consisting principally of citric acid, syrup, extractive, and mucilage.

The outer yellow rind of the fruit is a grateful aromatic bitter.

The unripe fruit dried are called Curaçoa oranges. They vary from the size of a pea to that of a cherry. They are bitterer than the rind of ripe oranges, but not so aromatic, and in tincture are used as a stomachic.

The leaves are neither so aromatic nor so bitter as the rind of the fruit.

The flowers *(flores naphæ)* are highly odoriferous, and have long been in great esteem as a perfume and as a condiment; their taste is somewhat warm, accompanied with a degree of bitterness. They yield their flavour in distillation both to spirit and water *(aqua florum naphæ).*

A very fragrant red-coloured oil, distilled from these flowers, is brought from Italy, under the name of *Oleum* or *Essentia Neroli;* but oil of behen, in which orange flowers have been digested, is frequently substituted for it: the fraud, however, is easily detected, as the real oil is entirely volatile, and the adulterated is not.

Medical use.—The leaves have been celebrated by some eminent physicians as a powerful antispasmodic in convulsive disorders, and especially in epilepsy; with others they have entirely failed. Orange flowers were at one time said to be an useful remedy in convulsive and epileptic cases; but experience has not confirmed the virtues attributed to them. As by drying they lose their virtues, they may be preserved for medical use by packing them closely in earthen vessels, with half their weight of muriate of soda. The juice of the fruit is of considerable use in febrile or inflammatory distempers, for allaying heat, quenching thirst, and promoting the salutary excretions, and acts as a specific in genuine scorbutus, or sea-scurvy. Although the Seville, or *bitter orange,* as it is called, has alone a place in our Pharmacopœias, yet the China, or sweet orange, is much more employed. Its juice is milder, and less acid. Dr Wright applied the roasted pulp as a poultice to fetid sores, in the West Indies, with very great success.

The rind proves an excellent stomachic and carminative, promoting appetite, warming the habit, and strengthening the tone of the viscera.

Sp. 1. CITRUS MEDICA. *Ed. Lond. Dub.*
Lemon tree.

Off.—The juice and the outer rind of the fruit, and the volatile oil of the outer rind.

a) SUCCUS CITRI MEDICI. Succus fructus. *Ed.*
LIMONES, baccæ. *Lond.*
SUCCUS FRUCTUS LIMONIS. *Dub.*
b) CORTEX CITRI MEDICÆ. Cortex exterior fructus. *Ed.*
CORTEX LIMONUM. Baccarum cortex exterior. *Lond.*
EPIDERMIS LIMONIS. *Dub.*

c) OLEUM VOLATILE CITRI MEDICÆ ex cortice fructus. *Ed.*
OLEUM ESSENTIALE LIMONIS. *Dub.*
OLEUM LIMONUM. Corticis exterioris oleum essentiale. *Lond.*

THE juice of lemons is analogous to that of oranges, from which it only differs in containing more citric acid and less syrup. The quantity of the former is indeed so great, that the acid has been named from the fruit, Acid of Lemons, and is always prepared from it. The simple expressed juice will not keep, on account of the syrup, extractive, mucilage, and water, which cause it to ferment.

The yellow peel is an elegant aromatic, and is frequently employed in stomachic tinctures and infusions; and yields by expression or distillation with water an essential oil, which is much used in perfumery.

Med. use.—Fresh lemon juice is truly specific in the prevention and cure of scurvy; that is, its effects are certain and cannot be explained; for the crystallized acid, and even the rob or inspissated syrup do not produce the same salutary effects. It is given freely mixed with water and sugar, and in a short time the symptoms disappear.

Lemon juice is also a powerful and agreeable antiseptic. Its powers are much increased, according to Dr Wright, by saturating it with muriate of soda. This mixture he recommends as possessing very great efficacy in dysentery, remittent fever, the bellyach, putrid sore throat, and as being perfectly specific in diabetes and lienteria. Citric acid is often used with great success for allaying vomiting: with this intention it is mixed with carbonate of potass, from which it expels the carbonic acid with effervescence. This mixture should be drunk as soon as it is made; or the carbonic acid gas, on which its anti-emetic power chiefly depends, may be extricated in the stomach itself, by first swallowing the carbonate of potass dissolved in water, and drinking immediately afterwards the citric acid properly sweetened. The doses are about a scruple of the carbonate dissolved in eight or ten drachms of water, and an ounce of lemon juice, or an equivalent quantity of citric acid.

Lemon juice is also an ingredient in many pleasant refrigerant drinks, which are of very great use in allaying febrile heat and thirst. Of these, the most generally useful is lemonade, or diluted lemon juice, sweetened.

COCCULUS PALMATUS. *Lond.* See COLUMBO.

COCCUS CACTI. *Ed.*

COCCUS, s. s. Coccus cacti. *Lond.*

COCCINELLA, s. s. Coccus cacti. *Dub.*

Cochineal.

COCHINEAL is the dried body of the female of a hemipterous insect. It is found only in Mexico, chiefly in the province of Oaxaia, on the leaves of a non-descript cactus, according to Humboldt. There are two kinds of the cochineal insect, which live on different species of cactus. The wild cochineal, *grana sylvester*, which is covered with a silky or cottony envelop, is less valuable than the cultivated or powdery cochineal, which is without that covering, grows to a larger size, and furnishes a finer and more permanent colour. From a very distant period, laws have existed against the adulteration of cochineal, and it is ordered to be exposed for sale in separate grains, not in agglutinated masses. 800,000 pounds are brought annually to Europe; and each pound contains at least 70,000 insects; Humboldt says, 32,000 arobas of 32 pounds each. From their appearance, when brought to us, they were long supposed to be the seed of some plant. They are small, irregular, roundish bodies, of a blackish-red colour on the outside, and a bright purple red within. Their taste is acrid, bitterish, and astringent. They are used chiefly for the sake of the fine colour which they produce, and they are principally consumed by the scarlet dyers. Their colour is easily extracted, both by alcohol, water, and water of ammonia; and in the dried insect it is not impaired by keeping for any length of time. It is worthy of notice, that not only the fruit, but even the green joints of several species of cactus, dye cotton purple or red.

The cochineal insect has been carefully analyzed by John. He gives as its constituents 50 of a peculiar carmine red colouring matter in a soft state, 10.5 of gelatin, 10 of a waxy fat, 14 of a gelatinous mucus, 14 of membranes, and 1.5 of alkaline and earthy phosphates and muriates. The colouring matter, to which he has given the name of *Cochinelin*, is soluble in water, alcohol, and ether, and is precipitated from its solutions by several of the earthy metallic salts. Dr Paris says cochineal is often adulterated by pieces of clay formed in moulds and coloured by cochineal. The fraud is easily detected by throwing a suspected sample into water, as the spurious grains dissolve.

Medical use.—Cochineal has been recommended as an anodyne to children in hooping-cough, but I do not know that it has been proved to possess any narcotic power. In pharmacy it is used for colouring tinctures and lip salves.

COCHLEARIA.

Willd. *g.* 1128. Smith, *Flor. Brit. g.* 297. *Tetradynamia Siliculosæ.*—Nat. ord. *Siliquosæ*, Linn., *Cruciferæ*, sect. *Cochleariæ*, Juss.

Sp. 1. Willd. *et* Smith. COCHLEARIA OFFICINALIS. *Dub.*

Common scurvy-grass.

Off.—The plant.

COCHLEARIÆ HERBA. *Dub.*

THIS is an annual plant, which grows on the sea-shore of the northern countries of Europe, and is sometimes cultivated in gardens. When fresh, it has a peculiar smell, especially when bruised, and a kind of bitter acrid taste, which it loses completely by drying, but which it imparts, by distillation, to water or alcohol. It also furnishes an essential oil, with sulphuretted hydrogen, the smell of which is extremely pungent.

Med. use.—The fresh plant is a gentle stimulant and diuretic, and is chiefly used for the cure of sea-scurvy. It may be eaten in substance, in any quantity, or the juice may be expressed from it, or it may be infused in wine or water, or its virtues may be extracted by distillation. The juice is recommended as a gargle in scorbutic affections of the gums and mouth.

Sp. 8. Willd. *sp.* 4. Smith. COCHLEARIA ARMORACIA. *Ed. Lond. Dub.*

Horse-radish.

Off.—The root.

RADIX COCHLEARIA ARMORACIÆ. *Ed.*

ARMORACIÆ RADIX. *Lond.*

RADIX RAPHANI RUSTICANI. *Dub.*

HORSE-RADISH is perennial, and sometimes found about river sides, and other moist places: for medicinal and culinary uses, it is cultivated in gardens. It flowers in June, but rarely perfects its seed in this country. The root has a pungent smell, and a penetrating acrid taste; but it also contains a sweet juice, which sometimes exudes upon the surface. Both water and alcohol extract its virtues by infusion. By drying, it loses all its acrimony, becoming first sweetish, and afterwards almost insipid: if kept in a cool place, covered with sand, it retains its pungency for a considerable time.

About 4 *per mille* of volatile oil, extremely pungent, and heavier than water, arose in distillation with water.

Medical use.—This root is an extremely penetrating stimulus. It excites the solids, and promotes the fluid secretions. It has frequently been of service in some kinds of scurvy, and other chronic disorders. Sydenham recommends it likewise in dropsies, particularly those which sometimes follow intermittent fevers.

COCOS BUTYRACEA. *Ed.*

Palmæ.—Nat. ord. *Palmæ*, Linn. & Juss.

The makaw tree.

Off.—The fixed oil of the nut, called Palm oil.

OLEUM FIXUM COCI BUTYRACEÆ EX NUCIBUS. *Ed.*

THIS tree is a native of South America. The fruit is triangular, yellow, and as big as a plum. The nut or kernel yields the *oleum palmæ* of the shops. It is first slightly roasted and cleaned, and then ground to a paste, first in a mill, and then on a levigating stone. This paste is gently heated, and mixed with $\frac{3}{10}$ its weight of boiling water, put into a bag, and the oil expressed between two heated plates of iron. It yields $\frac{7}{16}$ or $\frac{8}{10}$ of oil. If coloured, this oil may be purified by filtration, when melted. It then has the consistence of butter, a golden yellow colour, the smell of violets, and a sweetish taste. When well preserved, it keeps several years without becoming rancid. When spoiled, it loses its yellow colour and pleasant smell. It is said to be often imitated with axunge, coloured with turmeric, and scented with Florentine iris root. It is rarely used in medicine, and only externally as an emollient ointment. Of late it has been imported in considerable quantity, and used in the manufacture of a toilet-soap.

COLCHICUM AUTUMNALE. *Ed. Lond. Dub.*

Willd. *g.* 707, *sp.* 1. Smith, *Flor. Brit. g.* 187, *sp.* 1. *Hexandria Trigynia.*—Nat. ord. *Liliaceæ*, Linn., *Colchiceæ*, Juss.

Meadow saffron.

Off.—The root in the spring, when the leaves appear; and the seeds.

a) RADIX COLCHICI AUTUMNALIS. *Ed.*
RADIX COLCHICI; radix recens. *Lond.*
COLCHICUM; radix, primo vere, foliis jam apparentibus. *Dub.*
b) SEMINA COLCHICI. *Lond.*

MEADOW SAFFRON is a perennial bulbous-rooted plant, which grows in wet meadows in the temperate countries of Europe. It flowers in the beginning of autumn, at which time the old bulb begins to decay, and a new bulb to be formed. In the following May the new bulb is perfected, and the old one wasted and corrugated. It is dug up for medical use in the beginning of summer, before it shoots up its flower stem. Its activity is said to be destroyed by drying. This, however, is denied by Mr Haden. He recommends the roots to be cut into thin slices, spread out on perforated trays, and dried at a temperature of at least 130°; and Mr Battley coincides with him. From 8 lbs. of fresh roots, Mr Bainbridge got 2 lbs. 15 oz. of dried slices, which yielded 2 lbs. $10\frac{1}{4}$ oz. of fine powder, and 4 oz. of outside scales.

The seeds have lately been also recommended by Dr Williams in the form of a vinous infusion, as being less uncertain than that of the recent root.

The active properties of colchicum depend upon one of that numerous class of substances recently discovered, and which, from their possessing certain properties of alkalies, have been called alkaloids. Its existence in the root of the colchicum, and in that of white hellebore, was ascertained by Pelletier and Caventou; and it had been previously in 1819 discovered in the seeds of the veratrum sabadilla by Meissner and Van Mons, and called *Veratria.* It is worthy of remark, that before the principle upon which their activity depends was known, the white hellebore and meadow saffron should have each respectively been suspected to be the active ingredient of the *Eau medicinale* by Mr Moore and Mr Want. The discovery of *veratria* in both, is a strong presumption that the virtue of the *Eau d'Husson* really depends upon that alkaloid, from whatever plant it be prepared.

Medical use.—Stork, Collin, and Plenk, have celebrated its virtues as diuretic in hydrothorax, and other dropsies. The expressed juice is used in Alsace to destroy vermin in the hair.

It has been lately asserted, that colchicum forms the basis of the *Eau Medicinale d'Husson.* A saturated *Vinum col-*

chici, prepared by macerating two ounces of the fresh root cut in slices, in twenty-four ounces of white wine, in a gentle heat for six days, the spirit being previously carried off by heat, and filtering the solution, is now frequently used as a substitute for it in gout, chiefly on the recommendation of Sir E. Home, rheumatism, and dropsy; and there is no doubt that it produces similar, and sometimes even fatal, effects. It acts irregularly, but generally combines an anodyne effect with a drastic operation as an emetic, purgative, or diuretic. Dr Scudamore has ably treated of these pretended specifics in gout, and condemns them as ultimately injurious.

Mr Haden gives the powdered colchicum, in all inflammatory affections, in doses of from two to eight grains, with a scruple or more of sulphate of potass, every four or six hours; increasing the dose, until either vomiting or purging is produced on the second or third day, when the medicine is either laid aside, or given in diminished doses.

COLOCYNTHIDIS PULPA. *Lond. Dub.* See CUCUMIS.

RADIX COLOMBÆ. *Ed.*
RADIX CALUMBÆ. COCCULI PALMATI RADIX. *Lond.*
COLOMBO; radix. *Dub.*

THIS root is produced in Africa, in the country of the Caffres, and forms an important article of commerce with the Portuguese at Mozambique, in the province of Tranquebar. M. Barbier says, " The plant (*Menispermum palmatum*, *cocculus palmatus* of Decandolle,) is perennial, dioicous, with a tuberous fusiform root, and a simple voluble stalk. Commerson saw it cultivated at the Isle of France, whither it had been brought from the coast of Africa or India. M. Forbin afterwards found it at Mozambique." It is generally brought in transverse sections, from half an inch to three inches in diameter, rarely divided across. This is evidently done to facilitate its drying; for the large pieces are all perforated with holes. The bark is wrinkled and thick, of a dark brown colour on the outside, and bright yellow within. The pith in the centre is spongy, yellowish, and slightly striped. Its smell is faintly aromatic, and readily lost when not preserved in close vessels; its taste is unpleasant, bitter, and somewhat acrid; the bark has the strongest taste; the pith is almost mucilaginous. Its active constituent is a bitter principle, most probably of the nature of *picrotoxia*, as the plants which yield colomba and cocculus Indicus belong to the same genus. It also contains a great deal of mucilage. Planche says it contains one-fourth of its weight of starch. It is accordingly more soluble in water than in alcohol. The tincture is not precipitated by water, and does not affect the colour of infusion of turnsole, or solution of red sulphate of iron. A false colombo root, the produce of the *Frasera Walteri*, has been imported from the United States at Liverpool.

Medical use.—In India it is much used in diseases attended with bilious symptoms, particularly in cholera; and it is said to be sometimes very effectual in other cases of vomiting. It often produces excellent effects in dyspepsia. Half a drachm of the powder is given repeatedly in the day.

CONIUM MACULATUM. *Ed. Lond. Dub.*

Willd. *g.* 533, *sp.* 1. Smith, *Flor. Brit. g.* 130, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Hemlock.

Off.—The leaf, flower, and seed.

a) FOLIA CONII MACULATI. *Ed.*
FOLIA CONII. *Lond.*
FOLIA CICUTÆ. *Dub.*
b) SEMINA CICUTÆ. *Lond.* nondum matura. *Dub.*

THIS is a large biennial umbelliferous plant, which grows very commonly about the sides of fields under hedges, and in moist shady places. In spring it is very poisonous, in harvest less so. The stalk is often three, four, and even six feet high, hollow, smooth, not beset with hairs, but marked with red or brown spots. The leaves are large, and have long and thick footstalks; which at the lower end assume the form of a groove, and surround the stem.—From each side of the footstalk, other footstalks arise, and from these a still smaller order, on which there are sessile, dark-green, shining, lancet-shaped, notched leafits. The umbels are terminal and compound. The flowers consist of five white heart-shaped leaves. The seeds are flat on the one side, and hemispherical on the other, with five serrated ribs. This last circumstance, with the spots on the stalks, and the peculiar very nauseous smell of the plant, somewhat resembling the urine of a cat, serve to distinguish it from all other plants. We must not be misled by its officinal name Cicuta to confound it with the Cicuta virosa of Linnæus, which is one of the most virulent plants produced in this country, and readily distinguishable from the conium, by having its hollow roots always immersed in water, which those of the conium never are. The other plants which have been mistaken for the conium maculatum are, the æthusa cynapium, caucalis anthriscus, and several species of chærophyllum, especially the bulbosum, which, however, is not a native of this country.

Hemlock should not be gathered unless its peculiar smell be strong. The leaves should be collected in the month of June, when the plant is in flower. The leafits are to be picked off, and the footstalks thrown away. The leafits are then to be dried quickly in a hot sun, or rather on tin plates before a fire, and preserved in bags of strong brown paper, or powdered and kept in close vessels, excluded from the light; for the light soon dissipates their green colour, and with it the virtues of the medicine.

I do not know why the Dublin College orders the seeds to be gathered *unripe.* The narcotic seeds are most active and uniform when perfectly ripe. I have not met with a perfect analysis of hemlock. When the fresh root is wounded, it yields a bitter and acrid juice, which Störk found to excite in the tongue, swelling, stiffness, violent pain and transient paralysis. The expressed juice is green, and retains its colour when filtered through woollen cloth or coarse paper; but through fine filtering paper it becomes transparent, with a slight tint of brown, the green fœculum, chlorophylle, being retained. The filtered liquor deposites albumen, and is acid. With re-agents, the most remarkable property Pfaff observed, was that with pernitrate of mercury. The precipitate, and also the supernatant liquor, acquired a fine rose-red colour. Schrader made a comparative analysis of wild and cultivated hemlock and of green cabbage leaves, and he found the principles in all very much alike; the green fœculum alone possessed the peculiar smell which distinguishes hemlock; but Pfaff does not agree with him, and asserts, that the limpid filtered juice possessed the characteristic smell in the highest degree; and he is of opinion that the virtues of the hemlock reside in a volatile principle, which, however, he was not able to procure separate. The distilled water contains a little acetic acid, and smells of hemlock, but does not contain an atom of volatile oil or hydrocyanic acid, and it did not evince any narcotic properties even on birds. Dr Paris says that "the medicinal activity of the plant resides in a resinous element, which may be obtained in an insulated form by evaporating an etherial tincture made with the leaves on the surface of water. It has a rich dark green colour, and contains the peculiar odour and taste of hemlock in perfection. A dose of half a grain will produce vertigo and headach. It may be distinguished by the name of *Conein.*" There can be no doubt that the ether had dissolved the narcotic principle, but not pure, as the green colour certainly arose from its combination with chlorophylle, which ether dissolves from all green leaves. Nor can I agree with Pfaff that the narcotic principle is in itself very volatile. The smell of opium and the fumes of its decoction are highly narcotic, although its true narcotic principle, *morphia*, is fixed; and some of the narcotic bases, as atropia and solanea, cannot be prepared without danger. The narcotic principle of hemlock will probably be found to reside in an alkaloid; but experimenters should know, that phosphate of magnesia is precipitated by ammonia from hemlock and henbane juice, and that magnesia seems to have a tendency to form triple salts with magnesia. One other chemical remark: Hemlock juice soon ferments, and sometimes evolves nitrous gas. This was first mentioned to me by Mr Barry, and I find that the same singular phenomenon has been observed in the juices of beet, borrage, and woad. Pfaff says that nitre is frequently found crystallized in the extract of hemlock.

Med. use.—The whole plant is a virulent poison, but varying very much in strength, according to circumstances. When taken in an over-dose, it produces vertigo, dimness of sight, difficulty of speech, nausea, fetid eructations, anxiety, tremors, and paralysis of the limbs. But Dr Stoerk found, that in small doses it may be taken with great safety; and that, without at all disordering the constitution, or even producing any sensible operation, it sometimes proves a powerful remedy in many obstinate disorders. In scirrhus, the internal and external use of hemlock has been found useful, but mercury has been generally used at the same time. In open cancer it often abates the pain, and is free from the constipating effects of opium. It is likewise used in scrofulous tumours and ulcers, and in other ill-conditioned ulcers. It is also recommended by some in chincough, and various other diseases.

Its most common, and best form, is that of the powdered leaves, in the dose at first of two or three grains a-day, which in some cases has been gradually increased to upwards of two ounces a-day; but the preparation must have been bad, as I have found it sufficiently active to require caution in its exhibition. An extract from the seeds is said to produce giddiness sooner than that from the leaves.

CONTRAYERVÆ RADIX. *Lond.*

CONVOLVULUS.

Willd. *g.* 323. *Pentandria Monogynia.*—Nat. ord. *Campanaceæ*, Linn., *Convolvulaceæ*, Juss.

Sp. 4. CONVOLVULUS SCAMMONIA. *Ed. Lond. Dub.*

Scammony.

Off.—The gum-resin.

GUMMI-RESINA CONVOLVULI SCAMMONIÆ. *Ed.*
SCAMMONEÆ GUMMI-RESINA. *Lond.*
SCAMMONIUM. *Dub.*

THE scammony convolvulus is a climbing perennial plant, which grows in Syria, Mysia, and Cappadocia. The roots, which are very long and thick, when fresh, contain a milky juice. This is obtained by removing the earth from the upper part of the roots, and cutting off the tops obliquely. The milky juice which flows out is collected in a small vessel sunk in the earth at the lower end of the cut. Each root furnishes only a few drachms, but the produce of several roots is added together, and dried in the sun. This is the true and unadulterated scammony. It is light, of a dark grey colour, but becomes of a whitish yellow when touched with the wet finger, is shining in its fracture, has a peculiar nauseous smell, and bitter acrid taste, and forms with water a greenish milky fluid, without any remarkable sediment. In this state of purity it seldom reaches us, but is commonly mixed with the expressed juice of the root, and even of the stalks and leaves, and often with flour, sand, or earth. The best to be met with in the shops comes from Aleppo, in light spongy masses, having a heavy disagreeable smell, of a shining ash colour verging to black, friable, and easily powdered, powder of a light grey or whitish colour. An inferior sort is brought from Smyrna in more compact ponderous pieces, with less smell, not so friable, of a darker colour, not so resinous, and full of sand and other impurities. This is said to be the produce of the *Periploca scammonium*, and of the *Cynanchum monspeliacum*.

Resin is the principal constituent of scammony. Sixteen ounces of good Aleppo scammony give eleven ounces of resin, and three and a half of watery extract. Bouillon La Grange and Vogel obtained from 100 parts 60 of resin, 3 of gum, 2 of extract, and 35 of insoluble matter.

Medical use.—Scammony is an efficacious and powerful purgative. It may be given triturated with sugar, or with almonds, and becomes sufficiently safe and mild in its operation. It may likewise be conveniently dissolved by trituration, in a strong decoction of liquorice, and the solution then poured off from the fæces. The common dose of scammony is from three to twelve grains.

Sp. 61. CONVOLVULUS JALAPA. *Ed. Lond. Dub.*
Jalap.
Off.—The root.
RADIX CONVOLVULI JALAPÆ. *Ed.*
JALAPÆ RADIX. *Lond. Dub.*

JALAP is another climbing perennial species of convolvulus. It is an inhabitant of Mexico and Vera Cruz, from which it was first imported in 1610. When recent, the root is white and lactescent; but it is brought to us in thin transverse slices, which are covered with a blackish wrinkled bark, and are of a dark grey colour internally, marked with darker or blackish stripes. It has a nauseous smell and taste; and when swallowed it affects the throat with a sense of heat, and occasions a plentiful discharge of saliva. When powdered it has a yellowish grey colour.

Such pieces should be chosen as are most compact, hard, weighty, dark-coloured, and abound most with dark circular striæ and shining points; the light, whitish, friable, worm-eaten pieces must be rejected.

Slices of briony root are said to be sometimes mixed with those of jalap; but these may be easily distinguished by their whiter colour, and less compact texture.

Cadet de Gassicourt found in 1000 parts 100 of resin, 440 of gummy extract, 25 amylum, 25 albumen, 290 woody fibre, with phosphates, muriates and carbonates of lime, potass, magnesia, &c.

Medical use.—Jalap in substance, taken in a dose of about fifteen grains, proves an effectual, and in general a safe, purgative, performing the office mildly, except in hot bilious temperaments, when it gripes, but rarely takes due effect as a purge. An extract originally made by water purges almost universally, but weakly; and at the same time has a considerable effect by urine: what remains after this process gripes severely. The resin alone occasions violent gripings, and other distressing symptoms, but scarcely proves at all cathartic; triturated with sugar, or with almonds, into the form of an emulsion, or dissolved in spirit, and mixed with syrup, it purges plentifully in a small dose, without occasioning much disorder. The part of the jalap remaining after the separation of the resin, yields to water an extract, which has no effect as a cathartic, but operates powerfully by urine.

Copaifera officinalis. *Ed. Lond. Dub.*

Willd. *g.* 880, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Leguminosæ*, sect. *Papilionaceæ*, Juss.

Copaiva tree.

Officinal.—The resin called Balsam of copaiva.

Resina copaiferæ officinalis; resina liquida. *Ed.*
Copaiba; resina liquida. *Lond.*
Balsamum copaibæ. *Dub.*

The tree which produces this resin is a native of the Spanish West-India Islands, and of some parts of South America. It grows to a large size, and the resinous juice flows in considerable quantities from incisions made in the trunk. The juice is clear and transparent, of a whitish or pale yellow colour, an agreeable smell, and a bitterish pungent taste. It is usually about the consistence of oil, or a little thicker; when long kept it becomes nearly as thick as honey, retaining its clearness: but it has not been observed to grow dry or solid, as most of the other resinous juices do. The best resin of copaiva comes from Brazil.

Pure resin of copaiva dissolves entirely in alcohol: the solution has a very fragrant smell. Distilled with water, it yields a large quantity of a limpid essential oil, but no benzoic acid; it is therefore not a balsam, but a turpentine, a combination of resin and volatile oil.

Medical use.—The resin of copaiva is an useful tonic, but in some degree irritating. In large doses it proves purgative, promotes urine, and is supposed to clean and heal exulcerations in the urinary passages more effectually than any of the other resinous fluids. Fuller observes that it gives the urine an intensely bitter taste, but not a violet smell, as the common turpentines do.

This resin has been principally celebrated in chronic catarrh, gleets, and the fluor albus, and externally as a vulnerary.

The dose of this medicine rarely exceeds 20 or 30 drops, though some authors direct 60, or upwards. It may be conveniently taken in the form of an *oleosaccharum*, or in that of an emulsion, into which it may be reduced, by triturating it with almonds, with a thick mucilage of gum arabic, or with the yolk of eggs, till they are well incorporated, and then gradually adding a proper quantity of water.

CORIANDRUM SATIVUM. *Dub. Lond. Ed.*
Willd. *g.* 552, *sp.* 1. Smith, *Flor. Brit. g.* 142, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Coriander.

Off.—The seeds.

SEMINA CORIANDRI SATIVI. *Ed.*
CORIANDRI SEMINA. *Lond. Dub.*

CORIANDER is an annual umbelliferous plant, a native of the south of Europe, found wild about Ipswich, and in some parts of Essex, though Dr Smith does not consider it as indigenous. It differs from all other plants of its order in producing *spherical* seeds. Their smell, when fresh, is strong and disagreeable, but by drying becomes sufficiently grateful. They are recommended as carminative and stomachic.

CORNUA. *Lond. Dub.* See CERVUS.

CORTEX PERUVIANUS. *Dub.* See CINCHONA.

CRETA. *Lond. Dub.* See CALCIS CARBONAS.

CROCUS SATIVUS. *Ed. Dub.* (ANGLICUS). *Lond.*
Willd. *g.* 92, *sp.* 1. Smith, *Flor. Brit. g.* 16, *sp.* 1. *Triandria Monogynia.*—Nat. ord. *Liliaceæ*, Linn., *Irideæ*, Juss.

Saffron crocus.

Off.—The summits of the pistils, called Saffron.

STIGMATA CROCI. *Lond.*
CROCUS; floris stigma. *Dub.*
STIGMATA CROCI SATIVI. *Ed.*

CROCUS is a bulbous-rooted perennial plant, probably a native of the East, although it is now found wild in England. It is very generally cultivated as an ornament to our gardens, and in some places for the saffron, which is formed of the dried summits of the pistil. Each flower has one pistil, the summit of which is deeply divided into three slips, which are of a dark orange-red colour, verging to white at the base, and are smooth and shining. Their smell is pleasant and aromatic, but narcotic; their taste a fine aromatic bitter, and they immediately give a deep yellow colour to the saliva when chewed. The flowers are gathered early in the morning, just before they open; the summits of the pistils are picked out, very carefully dried by the heat of a stove, and compressed into firm cakes. The English saffron is superior to what is imported from other countries, and may be distinguished by its blades being broader. On the Continent, they reckon the Austrian and the French from Gatinois the best. The Spanish is rendered useless by being dipt in oil with the intention of preserving it. The finest saffron, hay saffron, consists of the pistils merely dried and not squeezed into a mass. Cake saffron should be chosen fresh, not above a year old, in close cakes, neither dry, nor yet very moist; tough and firm in tearing; difficultly pulverizable; of a fiery orange-red colour, within as well as without; of a strong, acrid, diffusive smell; and capable of colouring a very large proportion of water or alcohol. Saffron which does not colour the fingers when rubbed between them, or stains them with oil, has little smell or taste, or a musty or foreign flavour, is too tender, and has a whitish, yellow, or blackish colour, is bad.

On account of the great volatility of the aromatic part of the saffron, it should be wrapped up in bladder, and preserved in a box or tin case.

By distillation with water, saffron furnishes a small proportion of essential oil, of a golden yellow colour, heavier than water, and possessing the characteristic smell in an eminent degree. According to Hermbstædt, the soluble matter of saffron is extractive nearly pure. But Bouillon La Grange and Vogel have described it as a distinct principle, under the name of Polychroite.

Polychroite is got in scales of a reddish-yellow, deliquescent; bitter pungent taste like saffron; smell sweet like honey; soluble in water and alcohol; solutions lose their colour by exposure to light; sulphuric acid changes its colour to blue, then to lilac; nitric acid to grass green.

Medical use.—Saffron is a very elegant aromatic; besides the virtues which it has in common with all the bodies of that class, it has been alleged that it raises the spirits, and in large doses occasions immoderate mirth, involuntary laughter, and the other effects which follow from the abuse of spiritous liquors. It was supposed to be particularly serviceable in hysteric depressions, or obstructions of the uterine secretions. It is now little used except as a colouring substance.

CROTON.

Willd. *g.* 1713, *Monœcia Monadelphia.*—Nat. ord. *Tricoccæ,* Linn., *Euphorbiaceæ,* Juss.

Eleutheria, or Cascarilla.

Sp. 2. CROTON CASCARILLA. *Dub. Lond.*

47. CROTON ELEUTHERIA. *Swartz. Prodrom.* *Ed.*

Off.—The bark.

CORTEX CROTONIS ELEUTHERIÆ. *Ed.*

CORTEX CASCARILLÆ. *Lond. Dub.*

THIS bark is imported into Europe from the Bahama islands, and particularly from one of them of the name of Eleutheria; from which its trivial name is derived. But Dr Wright also found the tree on the sea-shore in Jamaica, where it is common, and rises to about twenty feet in height. It is the Clutia Eluteria of Linnæus; the bark of whose Croton cascarilla has none of the sensible qualities of the cascarilla of the shops.

This bark is in general imported either in curled pieces, or rolled up into short quills, about an inch in width, somewhat resembling in appearance the Peruvian bark. Its fracture is smooth, and close, of a dark brown colour. It is covered with a rough whitish epidermis; and in the inside it is of a brownish cast.

It has a light agreeable smell, and a moderately bitter taste, with some aromatic warmth. It burns readily, and yields, when burning, a very fragrant smell, resembling that of musk; a property which distinguishes the cascarilla from all other barks.

Tromsdorff got from eight ounces, 720 grains of mucilage and bitter principle; 580 of resin; 68 of volatile oil; 2520 of fibrous matter; and 48 of water. Its virtues are partially extracted by water, and totally by alcohol; but it is most effectual when given in substance.

Medical use.—It produces a sense of heat, and excites the action of the stomach; and it is therefore a good and pleasant stomachic, and may be employed with advantage in flatulent colics, internal hæmorrhagies, dysenteries, diarrhœas, and similar disorders.

As the essential oil is dissipated in making the extract, this preparation acts as a simple bitter.

Sp. 40. Persoon. CROTON TIGLIUM. *Lond.*

The oil expressed from the seeds,

TIGLII OLEUM. *Lond.*

This species is a native of India, and from its seeds is expressed the croton oil, admitted into the materia medica of the last edition of the London Pharmacopœia. The seeds themselves, in use among the natives of the East from time immemorial, were formerly well known in Europe as a drastic purgative, under the name of *Grana Molucca*, or *Grana Tilii*, but they had fallen into oblivion, when the attention of the profession was again called to them by the observations in Dr Ainslie's Materia Medica of Hindoostan. It is not however probable that the seed would have ever come into such general use, as the fixed oil expressed from them has done, in consequence of the exertions of Dr Conwell. The seed very much resembles in form the castor oil nut, and the plants belong to the same natural family. They are so active, that half a seed, or a grain weight, is a drastic purge; and many methods of mitigating its severity have been recommended by the native practitioners, such as removing the perisperm, picking out the embryo, and roasting or boiling the seeds. The cotyledons boiled soft were pounded into a mass, and made up with twice its weight of catechu, and divided into pills, containing half a grain of croton each, of which two were the dose for an adult. "In a very short time," says Mr Marshall, "after taking the pills, perhaps in half an hour, the patient is sensible of a rumbling motion in his bowels, which, after another half hour, is followed by a stool: this rumbling continues during the whole of the operation: the stools are invariably watery and copious. In about one case in ten, the medicine produces griping; in about one in thirty, nausea."

The purgative virtue resides in a fixed oil, which can be separated by expression, in the way in which castor oil is obtained. The oil seems to have been first prepared and used in medicine by the Dutch surgeons about a century ago; and Rumphius distinctly states that a single drop taken in Canary wine was a common purgative. A quantity of it was brought to Europe in 1820 by Mr Conwell, and it soon got into general use, and its qualities are such that it is likely to keep its place.

The oil is sold in very small bottles, is of a yellow colour, has a faint smell, and excites a very durable sense of heat and pricking in the throat. Dr Nimmo of Glasgow has found this oil to consist of 45 *per cent.* of an acrid purgative principle soluble in alcohol, sulphuric ether, and volatile and fixed oils, and of 55 *per cent.* of an oil insoluble in alcohol, bland, and like oil of olives. From the high price at which croton oil is as yet sold, it is frequently adulterated with the cheaper fixed oils; and in my own practice I have certainly found it of late milder than when first introduced. Dr Nimmo has suggested that the adulteration may be detected by the action of alcohol, which will dissolve a less proportion if mixed with olive oil, and a larger if mixed with castor oil; but it is evident this test will fail if it be adulterated with a mixture of olive and castor oils. From the great similarity of the burning sensation excited in the fauces by croton oil and by euphorbium resin, also a drastic purgative, and by the plants which yield them belonging to the same family, I suspect that their virtues depend upon the same proximate principle; but I failed in an experiment to imitate croton oil, by dissolving euphorbium in castor oil.

Medical use.—Croton oil is a very certain and powerful drastic purgative; and from the smallness of its dose, it can be given in circumstances where other effectual medicines cannot be swallowed. Thus, in coma, a drop or two let fall upon the tongue will operate; and to lunatics and other obstinate patients a sufficient dose can be easily administered with the food. To others it may be given made up into a pill with bread crumb, or a drop may be given on a lump of sugar; but where there is no reluctance to oil, one drop of croton oil with half an ounce of castor oil is a most effectual purge.

CUBEBA. *Lond.* See PIPER.

CUCUMIS COLOCYNTHIS. *Ed. Dub. Lond.*

Willd. *g.* 1741, *sp.* 1. *Monœcia Syngenesia.*—Nat. ord. *Cucurbitaceæ,* Linn. Juss.

Coloquintida, or bitter apple.

Off.—The medullary part of the fruit.

PULPA CUCUMERIS COLOCYNTHIDIS, ex fructu. *Ed.*
PULPA COLOCYNTHIDIS, peponum pulpa. *Lond.*
COLOCYNTHIS; fructus medulla. *Dub.*

THIS is an annual plant, a native of Turkey. The fruit is about the size of an orange; its medullary part, freed from the rind and seeds, is alone made use of in medicine; this is very light, white, spongy, composed of membranous plates, of an extremely bitter, nauseous, acrimonious taste. The fruit is gathered in autumn, when it begins to turn yellow, and is then peeled and dried quickly, either in a stove or in the sun.

Neumann got from 7680 parts 1680 alcoholic extract, and then 2160 watery; and inversely, 3600 watery, and 224 alcoholic.

The seeds are perfectly bland and highly nutritious; and we learn from Captain Lyon, that they constitute an important article of food in northern Africa.

Medical use.—The extract of colocynth is one of the most powerful and useful of our cathartics; but there is no more efficacious way of lessening its violence, than by reducing its dose.

CUMINUM CYMINUM. *Lond.*

Willd. *g.* 547, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Cummin.

Off.—The seeds.

SEMINA CUMINI. *Lond.*

THE cummin is an annual umbelliferous plant, in appearance resembling fennel, but much smaller. It is a native of Egypt; but the seeds used in Britain are brought chiefly from Sicily and Malta. Cummin seeds have a bitterish warm taste, accompanied with an aromatic flavour, not of the most agreeable kind, residing in a volatile oil.

CUPRUM. *Lond. Ed. Dub.*

Copper.

COPPER is found in many countries.

a. In its metallic state:

1. Crystallized. Native copper.
2. Sulphuretted alone, or with a little iron.
3. ———— with arsenic, iron, antimony or silver.

b. Oxidized:

4. Uncombined, red copper ore.
5. Combined, with carbonic acid.
6. ———— sulphuric acid.
7. ———— arsenic acid.
8. ———— muriatic acid.
9. ———— phosphoric acid.
10. ———— silicic acid.

Copper is bright red; disagreeable taste and smell when rubbed or heated; specific gravity 7.79; ductile; of great tenacity; sonorous; fusible at 27° Wedgwood; granulated texture, and subject to blisters: a good conductor of caloric, electricity, and galvanism; becomes brown, and at last green in the air; when heated turns blue, yellow, violet, deep brown; when ignited and plunged into water, forms brown, brittle scales of oxide. Its phosphuret is brilliant, brittle, hard, and fusible; its sulphuret brown, fusible, and very phosphoric; its alloy with arsenic is white, with bismuth reddish, with antimony violet, with mercury deep red, with zinc forms brass, and with tin is orange: it is oxidized and dissolved by the sulphuric, nitric, and muriatic acids; its oxide is brown, brittle, and soluble in ammonia, acquiring a beautiful blue colour.

Copper has more smell and taste than almost any other metal. Its effects, when taken into the stomach, are highly deleterious, and often fatal. It particularly affects the primæ viæ, exciting excessive nausea, vomiting, colic pains, and purging, sometimes of blood, or, though more rarely, obstinate constipation. It also produces agitation of the mind, and headach; renders the pulse small and weak, the countenance pale, and causes fainting, convulsions, paralysis, and apoplexy. When any of these symptoms occur, we must endeavour to obviate the action of the poison by large and copious draughts of oily and mucilaginous liquors, or to destroy its virulence by solutions of potass, or sulphuret of potass; but according to Orfila, there is no remedy at all comparable to sugar, a discovery which we owe to Marcelin Duval, and therefore as soon as we know that a person has been poisoned by copper, he should be made to swallow sugar and syrup in large quantities.

Poisoning from copper is most commonly the effect of ignorance, accident, or carelessness; and too many examples are met with of fatal consequences ensuing from eating food which had been dressed in copper vessels not well cleaned from the rust which they had contracted by being exposed to the action of air and moisture; or pickles, to which a beautiful green colour had been given, according to the homicidal directions of the most popular cookery books, by boiling them with halfpence, or allowing them to stand in a brass pan until a sufficient quantity of verdigris be found.

Great care ought to be taken that acid liquors, or even water, designed for internal use, be not suffered to stand long in vessels made of copper, otherwise they will dissolve so much of the metal as will give them dangerous properties. But the sure preventive of these accidents is, to banish copper utensils from the kitchen and laboratory. The presence of copper in any suspected liquor is easily detected by inserting into it a piece of polished steel, which will soon be coated with copper, or by dropping into it some carbonate of ammonia, which will produce a beautiful blue colour if any copper be present.

But although copper be thus dangerous, some preparations of it are in certain cases used with great advantage, both externally and internally.

The chief of these are,

1. The sub-acetate of copper. *Verdigris.*
2. The sulphate of copper. *Blue vitriol.*
3. The sub-sulphate of copper and ammonia.
4. The muriate of copper and ammonia.
5. A solution of the sulphate of copper and super-sulphate of alumina in sulphuric acid.

As the two first of these are never prepared by the apothecary, but bought by him from the manufacturer, they are inserted in the list of materia medica.

SUB-ACETAS CUPRI, v. s. Ærugo. *Ed.*
ÆRUGO, s. s. Sub-acetas cupri impura. *Lond.*
ÆRUGO. *Dub.*

Sub-acetate of copper. Verdigris.

THE preparation of this substance was almost confined to Montpelier in France, owing chiefly to a regulation which existed, that no verdigris could be sold until it had been examined and found of sufficiently good quality. Since that regulation has been abolished, the Montpelier verdigris has lost its decided superiority of character. It is prepared by stratifying copper-plates with the husks and stalks of the grape, which have been made to ferment after the juice has been expressed from them. In from ten to twenty days, when the husks become white, the plates of copper are taken out, and their surfaces are found to be covered with detached and silky crystals. They are now placed on edge, with their surfaces in contact, in the corner of a cellar, and alternately dipt in water, and replaced to dry every seven or eight days, for six or eight times. By this management the plates swell, and are every where covered with a coat of verdigris, which is easily separated with a knife. In this state it is only a paste, and is sold by the manufacturers to merchants who beat it well with wooden mallets, and pack it up in bags of white leather, a foot high, and ten inches wide, in which it is dried by exposing it to the air and sun until the loaf of verdigris cannot be pierced with the point of a knife.

Sub-acetate of copper should be of a bluish green colour, dry and difficult to break, and should neither deliquesce, have a salt taste, contain any black or white spots, nor be adulterated with earth or gypsum. Its purity may be tried by diluted sulphuric acid, in which the sub-acetate dissolves entirely, and the impurities remain behind.

Verdigris, as it comes to us, is generally mingled with stalks of the grape; they may be separated, in pulverization, by discontinuing the operation, as soon as what remains seems to be almost entirely composed of them.

Verdigris is also prepared in Britain, but its use is very much superseded in the arts by crystallized acetate of copper, or Distilled Verdigris as it is called. Copper forms several combinations with acetic acid, which have been carefully analyzed by Berzelius and by Mr Phillips, and the following estimate of the results is from Dr Thomson:

	Acetate.	*Diacetate.*	*Subsesquacetate.*	*Trisacetate.*
Oxide of copper, ...	6.25	6.25	6.25	6.25
Acetic acid, ...	5.	10.	7.50	15.
Water, ...	1.125	6.75	3.375	2.25
	12.375	23.	17.125	23.5

Medical use.—Verdigris is seldom or never used internally; applied externally, it proves a gentle detergent and escharotic, and is employed to destroy callous edges, or fungous flesh in wounds. It is also advantageously applied to scorbutic ulcers of the mouth, tongue, or fauces, and deserves to be carefully tried in cancerous sores.

SULPHAS CUPRI. *Ed.*
SULPHAS CUPRI, V. S. Vitrioleum cœruleum. *Dub.*
SULPHAS CUPRI. *Lond.*
Sulphate of copper. Blue vitriol.

THIS metallic salt is rarely formed by combining directly its component parts; but it is obtained, either by evaporating mineral waters which contain it, or by acidifying native sulphuretted copper, by exposing it to the action of air and moisture, or by burning its sulphur.

When pure it has a deep blue colour, and is crystallized generally in long rhomboids. It effloresces slightly in the air, is soluble in four parts of water at 60°, and in two at 212°, and is insoluble in alcohol. By heat it loses, first its water of crystallization, and afterwards all its acid. It is decomposed by the alkalies and earths, and some of the metals, the alkaline carbonates, borates, and phosphates, and some metallic salts.

Sulphate of copper consists of an atom of sulphuric acid =5; one of black oxide of copper =5, and five atoms of water =5.625; in all 15.625.

Medical use.—The sulphate of copper has a strong styptic, metallic taste, and is chiefly used externally as an escharotic for destroying warts, callous edges, and fungous excrescences, as a stimulant application to ill-conditioned ulcers, and as a styptic to bleeding surfaces. Taken internally, it operates, in very small doses, as a powerful emetic. It has, however, been exhibited in incipient phthisis pulmonalis, intermittent fever, and epilepsy; but its use is not free from danger.

CUSPARIÆ CORTEX. *Lond.* See BONPLANDIA.

CYDONIÆ SEMINA. *Lond.* See PYRUS.

DAPHNE MEZEREUM. *Ed. Lond. Dub.*

Willd. *g.* 733, *sp.* 1. Smith, *Flor. Brit. g.* 194, *sp.* 1. *Octandria Monogynia.*—Nat. ord. *Veprecula*, Linn., *Thymeleæ*, Juss.

Mezereon, spurge olive.

Off.—The bark of the root.

CORTEX DAPHNES MEZEREI. Ex radice. *Ed.*

CORTEX MEZEREI. Radicis cortex. *Lond. Dub.*

MEZEREON is indigenous, and is cultivated in our gardens as a flowering shrub. The bark, which is taken from the trunk, larger branches, and root, is thin, striped, reddish, commonly covered with a brown cuticle, has no smell, only a slightly sweet taste, but when chewed it slowly excites a very durable sensation of burning in the mouth and throat. When applied to the skin in its recent state, or infused in vinegar, it raises blisters. Its acrid principle is said to be soluble in ether. Vauquelin has discovered in the *daphne alpina* a peculiar principle, which he has called Daphnia, and in which the bitter resides. It is crystallizable, sparingly soluble in cold, and moderately in boiling water. It evaporates on being heated, in acrid vapours. The apothecaries use the entire root, of which the wood is yellow and hard, and has the same properties as the bark.

Medical use.—The root was long used in the Lisbon diet-drink, for venereal complaints, particularly nodes, and other symptoms resisting the use of mercury. The bark of the root contains most acrimony, though some prefer the woody part. Mezereon has also been used with good effect in tumours and cutaneous eruptions not venereal.

Dr Cullen says that it acts upon the urine, and upon the perspiration; and that in irritable habits it quickens the pulse, and increases the heat of the whole body. But Mr Pearson of the Lock Hospital asserts, that excepting a case or two of lepra, in which a decoction of this plant conferred temporary benefit, he very seldom found it possessed of medical virtues, either in syphilis, or in the sequelæ of that disease. In scrofula or in cutaneous affections it is employed chiefly under the form of decoction.

The berries are still more acrid than the bark, and they have even been known to produce fatal effects on children, who have been tempted by their beauty to eat them. It is said that they are sometimes infused in vinegar, to make it more pungent and appear stronger.

DATURA STRAMONIUM. *Ed. Dub. Lond.*

Willd. *g.* 377, *sp.* 1. Smith, *Flor. Brit. g.* 98, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ,* Linn. Juss.

Thorn-apple. James-town weed.

Off.—The plant and seeds.

a) HERBA DATURÆ STRAMONII. *Ed.*
HERBA STRAMONII. *Dub.*
STRAMONII FOLIA. *Lond.*
b) STRAMONII SEMINA. *Lond.*

THE thorn-apple is an annual plant, indigenous in the north of America, but now grows wild on dry hills and uncultivated places in England. The leaves are dark green, sessile, large egg-shaped, pointed, angular, and deeply indented, of a disagreeable smell and nauseous taste. Every part of the plant is a strong narcotic poison, producing vertigo, torpor, death. Dr Barton mentions the cases of two British soldiers, who ate it by mistake, for the Chenopodium album: one became furious, and ran about like a madman, and the other died, with the symptoms of genuine tetanus. The best antidote to its effects is said to be vinegar.

The seeds of the stramonium contain the narcotic principle which pervades the whole plant, but in a more uniform degree than the other parts, and hence are more to be depended upon for internal use. They are small, brownish, and rough in the surface. They are contained in an ovoid capsule, covered with very sharp prickles, consisting of four incomplete cells, communicating two and two, and opening equally by four valves.

An excellent analysis of the thorn-apple seeds has been published by M. Brandes in Buchner's Repertorium for 1821, and in which it is shewn that its peculiar properties depend upon a peculiar alkaloid, daturia.

Daturia crystallizes in small, probably four-sided prisms. It is purified by repeated solution in acids, decomposition of the salts and solution of the alkaloid in alcohol. It is more soluble in hot than in cold alcohol. It forms crystallizable salts with sulphuric, muriatic and nitric acids, and a deliquescent saline mass with acetic. It also combines with iodin. M. Brandes was affected with headach and dyspnœa always after tasting the salts of daturia, and therefore concludes that it is the narcotic principle of the seeds of the thorn-apple.

Medical use.—Dr Stoerk first tried stramonium as a remedy in mania and melancholy, with considerable success. Several cases of the same diseases were also cured or relieved by it under the direction of different Swedish physicians. It has also been employed, and sometimes with advantage, in convulsive and epileptic affections. Dr Barton of Philadelphia gives it in powder, beginning with doses of a few grains, and increasing them, in some days, to 15 or 20. In a case, in which it was exhibited to the extent of 30 grains, it dilated the pupil of one eye, and produced paralysis of the eyelids, which was removed by a blister. Hufeland gave it in the form of a tincture, prepared of two ounces of the seeds in four ounces of wine, and one of diluted alcohol, in diseases of the mind. The inspissated juice of the leaves has been most commonly used; but its exhibition requires the greatest caution. At first, a quarter of a grain is a sufficient dose. An ointment prepared from the leaves has been said to give ease in external inflammations and hæmorrhoids. And the bruised leaves, according to Plenk, soften hard and inflamed tumours, and discuss tumours in the breasts of nurses, from indurated milk.

The smoke of the stramonium has been much extolled for the cure of asthma. Its use in this manner has been derived from the East Indies, where, however, other species of *datura*, the *fatuosa* and *ferox*, are employed. It is the root and lower part of the stem which are used in this way.

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These are to be dried as quickly as possible, cut into slips, and beat so as to divide the fibres. The manner of using them is by filling the bowl of a tobacco-pipe, as with tobacco, and inhaling the smoke. Stramonium smoke excites a sense of heat in the chest, followed by copious expectoration, and sometimes attended with temporary vertigo or drowsiness, and rarely nausea. It frequently gives relief when a pipe is thus smoked upon a paroxysm being threatened, or even after its commencement: the patient falls asleep, and awakes recovered from the paroxysm. In some cases a perfect cure is effected, but more commonly the relief is only temporary. I have found it very valuable as a palliative, and the direct application of the remedy to the seat of the disease is rational at least.

The late Dr Marcet of London has published a very valuable paper on the use of stramonium, in Medic. Chirurg. Trans. vol. vii. p. 551. He used it in the form of extract; and the result of his experience is, that the most common effect of stramonium, when administered in appropriate doses *, in cases of chronic disease, attended with acute pain, is to lessen powerfully, and almost immediately, sensibility and pain; to occasion a sort of nervous shock, which is frequently attended with a momentary affection of the head and eyes, with a degree of nausea, and with phenomena resembling those that are produced by intoxication; to excite in many instances nervous sensations, which are referred to the œsophagus, or bronchia, or fauces, and which sometimes amount to a sense of suffocation; to have rather a relaxing than an astringent effect upon the bowels; to have no marked influence upon the frequency of the pulse, though in a few instances it has appeared to render it somewhat slower; to produce but a transitory and inconsiderable dilatation of the iris and pupil; and to have but little immediate tendency to induce sleep, except from the state of comparative serenity and ease, which generally follows the symptoms I have just described.

DAUCUS CAROTA. *Ed. Lond. Dub.*

Willd. *g.* 530, *sp.* 1. Smith, *g.* 128, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Carrot.

Off.—The seeds of the wild, and root of the garden, carrot.

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* "I mean from ⅛th to 1 grain, a dose which should not be exceeded till its effects have been ascertained." Dr M.

a) DAUCI SYLVESTRIS SEMINA. *Dub.*
DAUCI (AGRESTIS) SEMINA. *Lond.*
b) DAUCI (HORTENSIS) RADIX. *Lond.*
DAUCI CAROTÆ RADIX. *Ed.*

THIS is a biennial indigenous plant, is cultivated in great quantities as an article of food. The seeds, especially of the wild variety, have a moderately warm pungent taste, and an agreeable aromatic smell. They are carminative, and are said to be diuretic. The roots, especially of the cultivated variety, contain much mucilaginous and saccharine matter, and are therefore highly nutritious and emollient. When beaten to a pulp, they form an excellent application to carcinomatous and ill-conditioned ulcers, allaying the pain, checking the suppuration and fetid smell, and softening the callous edges.

DELPHINIUM STAPHISAGRIA. *Lond. Dub. Ed.*

Willd. *g.* 1061, *sp.* 13. *Polyandria Trigynia.*—Nat. ord. *Multisiliquæ*, Linn., *Ranunculaceæ*, sect. *Helleboreæ*, Juss.

Stavesacre.

Off.—The seed.

SEMINA STAPHISAGRIÆ. *Lond. Dub.*
DELPHINII STAPHISAGRIÆ SEMINA. *Ed.*

STAVESACRE is a biennial plant, a native of the south of Europe. The seeds are usually brought from Italy. They are large and rough, of an irregular triangular figure, of a blackish colour on the outside, and yellowish or whiteish within; they have a disagreeable smell, and a very nauseous, bitterish burning taste.

A new alkaloid, called Delphinia, was discovered nearly at the same time by Lasseigne and Feneulle in France, and by Brandes in Germany. It is obtained in the usual manner, either by boiling the decoction with pure magnesia, separating the fluid by filtration, and boiling the residuum with alcohol, which lets fall as it cools the alkaloid in white flocculi; or by acting upon the bruised seeds by dilute sulphuric acid, and adding subcarbonate of potass, which precipitates the alkaloid. Delphinia is soluble in alcohol and ether, sparingly so in water, saturates acids, and is precipitated by alkalies. Its taste is bitter and acrid. Its salts rarely form regular crystals, but a hard transparent mass. It contains no azote. In the seeds it is said to exist united with malic acid; and along with two bitter principles, one brown, and another yellow; oil, volatile and fixed; albumen, animalized matter, mucus, saccharine mucus, and mineral salts.

Med. use.—Stavesacre was employed by the ancients as a cathartic; but it operates with so much violence, both upwards and downwards, that its internal use has been for some time almost laid aside. It is chiefly employed in external applications for some kinds of cutaneous eruptions, and for destroying lice and other insects; insomuch, that from this virtue it has received its name in different languages.

DIANTHUS CARYOPHILLUS. *Lond. Ed.*

Willd. *g.* 893, *sp.* 9. Smith, *g.* 209, *sp.* 3. *Decandria Digynia.*—Nat. ord.—*Caryophylleæ,* Linn. Juss.

Clove Gillyflower. Clove pink, or carnation.

Off.—The flowers.

FLORES DIANTHI CARYOPHYLLI. *Ed.*

FLORES RUBRI CARYOPHYLLI. *Dub.*

THIS species of dianthus is perennial, and is a native of Italy, though now found wild on the walls of old castles in England. By cultivation, its varieties have increased to a very great number, and they form one of the greatest ornaments of our flower gardens. Most of these are termed Carnations; but the variety which is officinal surpasses all the others in the richness of its smell. Their only use in pharmacy is to give a pleasant flavour and beautiful colour to an officinal syrup.

DIGITALIS PURPUREA. *Ed. Lond. Dub.*

Willd. *g.* 1155, *sp.* 1. *Didynamia Angiospermia.*—Nat. ord. *Solanaceæ,* Linn., *Scrophulariæ,* Juss.

Foxglove.

Off.—The leaves and seeds.

a) DIGITALIS PURPUREÆ FOLIA. *Ed.*
DIGITALIS FOLIA. *Lond. Dub.*
b) DIGITALIS SEMINA. *Lond.*

THIS is an indigenous biennial plant, very common on hedge-banks, and sides of hills, in dry, gravelly, or sandy soils, and the beauty of its appearance has gained it a place in our gardens and shrubberies. The leaves are large, oblong, egg-shaped, soft, covered with hairs, and serrated. They have a bitter, very nauseous taste, with some acrimony. Destouches analysed foxglove. Four ounces of the dried leaves yielded successively 9 drachms of watery, and

78 grains of alcoholic extract. The first was brown, smooth, and of a consistence fit for making pills. The second had a very deep green colour, a virose and disagreeable smell, the consistence of tallow, but more tenacious; did not furnish ammonia by distillation, and was not acted upon by acids. The ashes contained salts of lime and potass.

The seeds are very small, and contained in an ovoid capsule.

Med. use.—The effects of foxglove, when taken into the stomach, are,

1. To diminish the frequency of the pulse.
2. To diminish the irritability of the system.
3. To increase the action of the absorbents.
4. To increase the discharge by urine.

In excessive doses, it produces vomiting, purging, dimness of sight, vertigo, delirium, hiccough, convulsions, collapse, death. For these symptoms, the best remedies are cordials and stimulants.

Internally, digitalis has been recommended,

1. In inflammatory diseases, from its very remarkable power of diminishing the velocity of the circulation.

2. In active hæmorrhagies; in phthisis.

3. In some spasmodic affections, as in spasmodic asthma, palpitation, &c.

4. In mania from effusion on the brain.

5. In anasarcous and dropsical effusions.

6. In scrofulous tumours.

7. In aneurism of the aorta, and hypertrophy of the heart, I have seen it alleviate the most distressing symptoms.

Externally, it has been applied to scrofulous tumours.

It may be exhibited,

1. In substance, either by itself, or conjoined with some aromatic, or made into pills, with soap or gum ammoniac. Withering directs the leaves to be gathered after the flowering stem has shot up, and about the time when the blossoms are coming forth. He rejects the leaf-stalk, and middle rib of the leaves, and dries the remaining part, either in the sunshine, or before the fire. In this state, they are easily reduced to a beautiful green powder, of which we may give, at first, one grain twice a-day, and gradually increase the dose until it act upon the kidneys, stomach, pulse, or bowels, when its use must be laid aside, or suspended.

2. In infusion. The same author directs a drachm of the dried leaves to be infused for four hours in eight ounces of

boiling water, and an ounce of any spiritous water to be added to the strained liquor, for its preservation. Half an ounce, or an ounce of this infusion, may be given twice a-day.

3. In decoction. Darwin directs that four ounces of the fresh leaves be boiled in two pounds of water, until they be reduced to one, and that half an ounce of the strained decoction be taken every two hours, for four or more doses.

4. In tincture. Put one ounce of the dried leaves, coarsely powdered, into four ounces of diluted alcohol; let the mixture stand by the fire-side twenty-four hours, frequently shaking the bottle; and the saturated tincture, as Darwin calls it, must then be separated from the residuum, by straining or decantation. Twenty drops of this tincture were directed to be taken twice or thrice a-day, but the dose is dangerous. The Edinburgh College use eight ounces of diluted alcohol to one of the powder, but let it digest seven days.

5. The expressed juice and extract are not proper forms of exhibiting this very active remedy.

When the digitalis is disposed to excite looseness, opium may be advantageously conjoined with it; and when the bowels are tardy, jalap may be given at the same time, without interfering with its diuretic effects. During its operation in this way, the patient should drink very freely. Two cases of phthisis are related by Dr Gregg, in which it produced a copious ptyalism. It sometimes excites delirium.

DOLICHOS PRURIENS. *Ed. Lond. Dub.*

Willd. *g.* 1349, *sp.* 16. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ*, Linn., *Leguminosæ*, sect. *Papilionaceæ*, Juss.

Cow-itch.

Officinal.—The stiff hairs which cover the pods.

PUBES DOLICHI PRURIENTIS, ex legumine. *Ed.*
PUBES DOLICHI. LEGUMINUM PUBES. *Lond.*
SETÆ LEGUMINUM DOLICHI. *Dub.*

THE dolichos is a climbing plant, growing in great abundance in warm climates. The pods are about four inches long, round, and as thick as a man's finger. On the outside they are thickly beset with stiff brown hairs, which, when applied to the skin, occasion a most intolerable itching. In the choice of cow-itch, we must reject all those pods which are shrivelled, brown, and diminutive in size, have lain long in damp warehouses, and are musty, or of a bad colour.

Med. use.—The ripe pods are dipped in syrup, which is again scraped off with a knife. When the syrup is rendered by the hairs as thick as honey, it is fit for use. It acts mechanically as an anthelmintic, occasions no uneasiness in the primæ viæ, and may be safely taken, from a tea-spoonful to a table-spoonful in the morning, fasting. The worms are said to appear with the second or third dose; and by means of a purge, in some cases the stools have consisted entirely of worms. For further information, the publications of Mr Chamberlayne may be consulted.

DORSTENIA CONTRAJERVA. *Ed. Lond.*

Willd. *g.* 244, *sp.* 5. *Tetrandria Monogynia.*—Nat. ord. *Scabridæ*, Linn., *Urticeæ*, Juss.

Contrayerva.

Officinal.—The root.

RADIX DORSTENIÆ CONTRAJERVÆ. *Ed.*
RADIX CONTRAJERVÆ. *Lond.*

THIS plant is perennial, and grows in South America, and some of the Caribæan islands.

The root is knotty, an inch or two long, and about half an inch thick, of a reddish brown colour externally, and pale within; long, rough, slender fibres shoot out from all sides of it, and are generally loaded with small brown knots. It has a peculiar kind of aromatic smell, and a somewhat astringent, warm, bitterish taste, with a light and sweetish kind of acrimony, when long chewed: the fibres have little taste or smell; the tuberous part, therefore, should be alone chosen.

This root contains so much mucilage, that a decoction of it will not pass through the filter. Neumann got from 480 parts, 190 watery extract, and afterwards 7 alcoholic, and inversely, 102 alcoholic, and 60 watery. I find that the tincture reddens infusion of litmus, is precipitated by water, and has no effect on the salts of iron.

Medical use.—Contrayerva is a gentle stimulant and a diaphoretic, and is sometimes given in exanthematous diseases, typhus, and dysentery. Its dose is about half a drachm.

ELATERIUM. *Lond. Dub.* See MOMORDICA.

ELEMI. *Lond. Dub.* See AMYRIS.

ENULA CAMPANA. *Dub.* See INULA.

ERYNGIUM MARITIMUM. *Dub.*

Willd. *g.* 518, *sp.* 6. Smith, *g.* 121, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Umbellatæ.*, Linn. Juss.

Sea-eryngo. Sea-holly.

Officinal.—The root.

ERYNGIUM; radix. *Dub.*

THIS plant grows plentifully on some of our sandy and gravelly shores. It is perennial, and flowers in July and August. The roots are slender and very long; of a pleasant sweetish taste, which, on chewing them for some time, is followed by a light degree of aromatic warmth and acrimony. They are accounted aperient and diuretic, and have also been celebrated as aphrodisiac; but probably without foundation.

EUGENIA CARYOPHYLLATA. *Dub. Lond. Ed.*

Willd. *g.* 972, *sp.* 24. *Icosandria Monogynia.*—Nat. ord. *Hesperideæ*, Linn., *Myrtineæ*, Juss.

The clove tree.

Officinal.—The calyx, flower-bud and its essential oil.

a) FLORES EUGENIÆ CARYOPHYLLATÆ. Flores nondum expliciti. *Ed.*
CARYOPHYLLI. Flores nondum expliciti, siccati. *Lond.*
CALYX CARYOPHYLLI AROMATICÆ. *Dub.*

b) OLEUM VOLATILE EUGENIÆ CARYOPHYLLATÆ. Ex floribus nondum explicitis. *Ed.*
OLEUM CARYOPHYLLORUM. Eorum oleum essentiale. *Lond.*
OLEUM ESSENTIALE CARYOPHYLLI AROMATICÆ. *Dub.*

THIS is a beautiful tall tree, a native of the Molucca islands. Every part of this tree is highly aromatic, especially the leaf stalk. Cloves are the flower-buds, which are gathered in October and November, before they open, and when they are still green, and are dried in the sun, after having been exposed to smoke for some days.

Cloves have somewhat the form of a nail. Their colour should be of a deep brown, their smell strong, peculiar, and grateful; their taste acrid, aromatic, and permanent. The best cloves are also large, heavy, brittle, and when pressed with the nail, exude a little oil. When light, soft, wrinkled, dirty, pale, and without smell or taste, they are to be rejected.

Cloves yield by distillation with water about one-seventh of their weight of volatile oil; 960 parts also gave to Neumann 380 of a nauseous, somewhat astringent, watery extract. The same quantity gave 300 of excessively fiery alcoholic extract. When the alcoholic extract is freed from the volatile oil by distillation with water, the oil that arises proves mild, and the resin that remains insipid. Its pungency therefore seems to depend on the combination of these principles. The Dutch oil of cloves is extremely hot and fiery, and of a reddish brown colour, but it is greatly adulterated, both with fixed oils and resin of cloves; for the genuine oil, when recently distilled, is comparatively mild and colourless, although it gradually acquires a yellow colour. It is heavier than water, and rises in distillation with some difficulty.

The leaves of the *Agathophyllum ravensara*, and also the leaves of the cinnamon tree, yield an essential oil absolutely the same with oil of cloves in respect to colour, taste, smell, and gravity, being heavier than water.

Medical use.—Cloves, considered as a medicine, are very hot stimulating aromatics, and possess in an eminent degree the general virtues of substances of this class.

EUPHORBIA OFFICINARUM. *Lond.*

Willd. *g.* 959, *sp.* 7. *Dodecandria Trigynia.*—Nat. ord. *Tricoccæ*, Linn., *Euphorbiaceæ*, Juss.

Officinal euphorbia.

Officinal.—The gum-resin.

EUPHORBIÆ GUMMI RESINA. *Lond.*

THE London College have restored this drastic and corrosive substance to their list of officinals. It is produced from several species of the African genus Euphorbia; such as the *E. officinarum* of the Cape of Good Hope, the *E. antiquorum*, which grows in Egypt, Arabia, and the East Indies, and which is said to have furnished the Euphorbium of the ancients and that now imported by the Dutch, and the *E. Canariense*, which is said to furnish that imported by the English. Mr Jackson, in his account of Morocco, has described this species. The inhabitants of the lower regions of Atlas make incisions in the branches of the plant with a knife, a corrosive milky juice issues, which after being heated by the sun, becomes a substance of a whitish yellow colour, and in the month of September drops off, and forms Euphorbium. The plants produce abundantly only once in four years; but this fourth year's produce is more than all Europe can consume; for, being a very powerful cathartic, it is but little used. The people who collect Euphorbium are obliged to tie a cloth over their mouth and nostrils, to prevent the small dusty particles from annoying them, as they produce incessant sneezing. The branches are used in the tanning of Morocco leather, and the juice is in great request among the women as a *depilatory*.

Euphorbium is brought to us immediately from Barbary, in drops of an irregular form; of a pale yellow colour externally, but somewhat white within: which break easily between the fingers. The most complete examination of this substance is that by Brandes, who got 43.5 of resin, 13.5 of cerin, 12 of myricin, 49 of caoutchouc, and the remainder was chiefly malates of potass and lime, with a little sulphates and phosphates. It contained no volatile oil, gum or tragacanth, and its acrimony resided entirely in the resin. Brandes therefore approves of Kastner's idea of considering it as a *saline waxy resin.* The separated resin was of a dark reddish brown colour, in splinters of a brownish yellow, and transparent; its smell sweetish; its taste at first not remarkable, then pungent, exciting the salivary glands, and remarkably burning; its consistence dry, brittle, but receiving easily the impression of the nail; in the air permanent; in a platinum spoon melts, and gets charred, with the evolution of the smell of benzoin, and much ebullition. It is soluble in ether, alcohol, oil of turpentine and of almonds, and partially in acids and alkalies. In its chemical qualities it therefore coincides with the common resins, but differs from them in its pungency, in which it is analogous to the resin of black and Cayenne pepper, and to the bark of mezereon and pellitory root, with which Pfaff has associated it. Dissolved in alcohol, and applied to the skin, it excites, after a time, violent burning and great redness of the skin. Euphorbium is extremely troublesome to pulverize; the finer part of the powder, which flies off, affecting the head in a violent manner. It burns with an agreeable smell and a bright flame.— When applied to the tongue, it seems at first to have no taste, but on being held some time in the mouth, it excites a very violent biting and burning; which lasts a long time, and cannot be abated by washing out the mouth. The acrimony of this substance is so great, as to render it unfit for internal use.

FARINA. *Lond.* See TRITICUM.

FERRUM. *Lond. Dub. Ed.*
Iron.

THIS is the most common of all metals. It seems even to be a constituent of organic substances, and is the only metal which, when taken into the body, exerts no deleterious action upon it. The numerous ores of iron which are found in every part of the globe may be reduced to the following genera.

1. Native iron. Immense isolated masses of this have been found in Siberia and in South America. Their origin is still problematical.
2. Carburetted iron. Plumbago.
3. Sulphuretted iron. Pyrites.
4. Oxidized iron.
    - *a.* Protoxide. Magnetic and specular iron ore.
    - *b.* Peroxide. Not magnetic; red iron stone.
    - *c.* Carbonated.
    - *d.* Arseniated.
    - *e.* Tungstated.
    - *f.* Phosphated.
    - *g.* Chromated.
    - *h.* Sulphated.
    - *i.* Silicated.

Iron is of a bluish-grey colour; texture either fine grained, fibrous, or dense plates; sapid and odorous; specific gravity 7.600; the hardest, most elastic, and most tenacious metal; very ductile; fusing at 158° Wedgwood, fusion at first clammy, afterwards very fluid; igniting by strong percussion, and inflaming by the collision of flint; magnetic. It is oxidized slowly in the air, especially when moist; when heated in contact with air, it is oxidized; protoxide, consisting of one proportion of iron 3.5, and one of oxygen $1=4.5$, black, fusible, hard, brittle, lamellated, still attracted by the magnet; deutoxide, consisting of one proportion of iron 3.5, and one and a half of oxygen $1.5=5$, fine pulverulent, not attracted by the magnet. Iron burns with splendour and deflagration in oxygen gas, and is converted into a fused black oxide; it decomposes water slowly, and when ignited very rapidly. Iron is oxidized and dissolved by almost all the acids. It gives to glass a brown, smoky, deep green, or black colour. Carbon united to iron converts it into steel.

Steel is of a grey colour, brilliant and granular in its fracture; specific gravity 7.795; harder than any of the metals, and more elastic, ductile, malleable, and fusible at a lower temperature than pure iron. Its characteristic property is, that after being heated, if suddenly plunged into cold water, it becomes harder, more elastic, less pliable and brittle; but by being again heated and cooled slowly, it acquires its former softness, pliability, and ductility. Steel contains only some hundredth parts of carbon, and is known chemically by letting a drop of acid fall upon it, which produces a grey or black spot. *Plumbago* consists of about 0.1 of iron, combined with carbon.

As the mechanical division of iron is extremely difficult, it is directed to be kept in the shops in the state of filings or wire, and the scales of black oxide, which are found around the smith's anvil. Solt malleable iron is the only kind fit for internal use, as steel and cast-iron always contain impurities, and often arsenic.

Iron is officinal,

I. In its metallic state.
    1. *a.* Limatura ferri. *Ed.*
        ——————— purificata. *Ed.*
        Ferri ramenta. *Lond.*
        Scobs ferri. *Dub.*
    b. Ferri fila. *Lond. Ed.*
    2. Sulphuretted,
        Sulphuretum ferri. *Ed.*
II. Oxidized.
    1. Protoxide,
        a. Oxidum ferri nigrum. *Ed.*
            Squamæ oxydi ferri. *Dub.*
        b. Oxidum ferri nigrum purificatum. *Ed.*
            Oxydum ferri nigrum. *Dub.*
    2. Peroxide,
        Oxidum ferri rubrum. *Ed. Dub.*
    3. Carbonated,
        a. Subcarbonas ferri præparatus. *Ed.*
            Rubigo ferri. *Dub.*
        b. Carbonas ferri præcipitatus. *Ed.*
            Ferri subcarbonas. *Lond.*
            Carbonas ferri. *Dub.*
    4. Supercarbonated; as in the chalybeate mineral waters.

5. Sulphated,
   Ferri sulphas. *Ed. Lond. Dub.*
6. Subsulphated,
   Sulphas ferri exsiccatus. *Ed. Dub.*
7. Muriated,
   a. Tinctura muriatis ferri. *Ed. Lond. Dub.*
   b. Tinctura muriatis ferri cum oxydo rubro. *Dub.*
8. With muriate of ammonia,
   Murias ammoniæ et ferri. *Ed. Dub.*
   Ferrum ammoniatum. *Lond.*
      Tinctura ferri ammoniati. *Lond.*
9. Acetated,
   Acetas ferri. *Dub.*
      Tinctura acetatis ferri. *Dub.*
      Tinctura acetatis ferri cum alcohol. *Dub.*
10. With nitrate of potass,
   Liquor ferri alkalini. *Lond.*
11. With tartrate of potass,
   Ferrum tartarizatum. *Lond.*
   Tartras potassæ et ferri. *Ed.*
   Tartarum ferri. *Dub.*
      Vinum ferri. *Dub. Lond.*

FERRUM, s. s. Ferri ramenta et fila. *Lond.*
FILA FERRI. *Ed.*
LIMATURA FERRI. *Ed.*
SCOBS FERRI. *Dub.*
Iron. Iron-filings. Iron-wire.

Medical use.—The general virtues of this metal, and its preparations, are, to constringe the fibres, to quicken the circulation, to promote the different secretions, and at the same time to repress inordinate discharges in the intestinal tube. By the use of chalybeates, the pulse is very sensibly raised; the colour of the face, though before pale, changes to a florid red; the alvine, urinary, and cuticular excretions, are increased. Fetid eructations, and black coloured fæces, are marks of their taking due effect.

When given improperly, or to excess, iron produces headach and anxiety, heats the body, and often causes hæmorrhagies, or even vomiting, pains in the stomach, and spasms and pains of the bowels.

Iron is given in most cases of debility and relaxation.

1. In passive hæmorrhagies.
2. In dyspepsia, hysteria, and chlorosis.

3. In most of the cachexiæ, and it has been lately recommended as a specific in cancer.
4. In general debility produced by disease, or excessive hæmorrhage.
5. In neuralgia.

Where either a preternatural discharge, or suppression of natural secretions, proceeds from languor and weakness, this metal, by increasing the motion of the fluids, and the strength of the solids, will suppress the flux, or remove the suppression; but where the circulation is already too quick, the solids too tense and rigid, where there is any stricture or spasmodic contraction of the vessels, iron and all its preparations will aggravate both distempers.

Iron probably has no action on the body when taken into the stomach, unless it be oxidized. But during its oxidizement, hydrogen gas is evolved; and, accordingly, we find that fetid eructations are considered as a proof of the medicine having taken effect. It can only be exhibited internally in the state of filings, which may be given in doses of from five to twenty grains, either in the form of powder, with some aromatic, or made into an electuary or bolus or pills with any bitter extract. Iron-wire is to be preferred for pharmaceutical preparations, both because it is the most convenient form, and because it is always made of the purest iron.

OXIDUM NIGRUM FERRI. *Ed.*
OXYDI SQUAMÆ FERRI. *Dub.*

The scales of iron. The scales of the oxide.

WHEN iron is heated to redness in the smith's forge, to render it more malleable, its surface becomes oxidized by the action of the atmospheric air; and as the oxide formed does not adhere to the iron, it is easily separated by percussion on the anvil, and flies off in the state of sparks, which, when cool, constitute the scales of iron. In these the iron is oxidized to that degree in which it is soluble in acids, without the production of hydrogen gas; therefore, when taken into the stomach, they do not produce the distention and flatulence occasioned by the use of the filings. In the Parisian codex there is a formula for preparing the protoxide from iron-filings and water.

SULPHAS FERRI. *Dub. Ed. Lond.*

Sulphate of iron. Green vitriol. Copperas.

THE sulphate of iron of commerce is commonly obtained by the spontaneous oxidizement of sulphuretted iron, and sulphate of alumina is often formed at the same time, but the alum and copperas are separated by means of their different crystallizability, and subsequent lixiviation and crystallization. Sulphate of iron thus obtained is never pure, and often contains zinc or copper. The copper may be separated by adding some metallic iron to the solution; but we have no means of separating the zinc; therefore, in order to obtain it in a state of purity, we must prepare it by dissolving iron in diluted sulphuric acid. Its crystals are transparent rhomboidal prisms, of a fine green colour. They are soluble in two parts of cold, and in less than their own weight of boiling water. They are insoluble in alcohol.

They are composed of one atom of sulphuric acid 5; one of protoxide of iron 4.5; seven of water 7.875=17.375.

Green sulphate of iron is decomposed by all the earths and alkalies, and by those salts whose base forms an insoluble compound with sulphuric acid. It is also decomposed by exposure to the air, especially when in solution, and by all substances which part readily with their oxygen. The oxide of iron absorbs oxygen, and passes to the state of red oxide, which forms a red sulphate, possessing properties very different from those of the green sulphate.

Med. use.—Taken internally, the green sulphate in considerable doses is apt to excite pain in the stomach, and spasms in the bowels; and in large doses it causes vomiting. In small doses, however, of from one to three grains, it is often given as a tonic, astringent, or anthelmintic.

FERULA ASSAFŒTIDA. *Ed. Lond. Dub.*

Willd. *g.* 539, *sp.* 11.—*Pentandria Digynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Assafœtida.

Officinal.—The gum-resin.

GUMMI RESINA FERULÆ ASSÆ FŒTIDÆ. *Ed.*
ASSAFŒTIDÆ GUMMI RESINA. *Lond.*
ASSAFŒTIDA. *Dub.*

THE plant which furnishes assa fœtida is perennial, and a native of the south of Persia. The gum-resin is procured from the roots of plants which are at least four years old. When the leaves begin to decay, the stalk is twisted off, and the earth removed from about their large tapering roots. The top of the root is some time afterwards cut off transversely; and in forty-eight hours, the juice which has exuded is scraped off, and a second transverse section is made. This operation is repeated until the root be entirely exhausted of juice. After being scraped off, the juice is exposed to the sun to harden.

It is brought to us in large irregular masses, composed of various little shining lumps or grains, which are partly of a whitish colour, partly reddish, and partly of a violet hue. Those masses are accounted the best which are clear, of a pale reddish colour, and variegated with a great number of elegant white tears.

This drug has a strong fetid smell, somewhat like that of garlic; and a bitter, acrid, biting taste. It loses some of its smell and strength by keeping, a circumstance to be particularly regarded in its exhibition.

Assafœtida has been lately examined by Brandes with his usual accuracy and minuteness. He got 46 volatile oil, a trace of phosphorus, 472 of resin, 16 of resinoid, 194 of gum with traces of acetate, malate, sulphate and phosphate of potass and lime, 64 of tragacanth, 10 of extractive with malate of potass, 62 of sulphate of lime with traces of potass, 4 of oxide of iron and alumina, 60 of water, and 46 of impurities. The smell and taste depend entirely upon the volatile oil, which adheres strongly to the resin. Its resin is peculiar in the blue colour of its solution in alkalies, and it seems to enter into intimate combination with them. The resinoid or hard resin seems to occur in many vegetables, and to have the same relation to resin that tragacanth has to gum. From the large proportion of saline matter, Brandes thinks it should be considered as a *saline gummy resin.*

The seeds of a congenerous species growing in the north of Persia, the *Ferula Persica,* sent by Dr Guthrie of St Petersburgh to Dr Hope, vegetated and even produced fertile seeds in the open air at Edinburgh.

Medical use.—It is the most powerful of all the fetid gums, and is a most valuable remedy. It acts as a stimulant, antispasmodic, expectorant, emmenagogue, and anthelmintic. Its action is quick and penetrating.

It is often serviceable,

1. In spasmodic croup.
2. In dyspepsia, amenorrhœa, and chlorosis.
3. In asthma, dyspnœa, and hysteria.
4. In tympanites and worms.

It is exhibited,

1. In substance, in the form of pills; in doses of from

five to twenty grains, either alone, or combined with bitter extracts or purgatives.

2. Dissolved in some simple distilled water.
3. Dissolved in alcohol.
4. In the form of clyster, to the extent of about two drachms.

FICUS CARICA. *Ed. Lond. Dub.*

Willd. *g.* 1931, *sp.* 1. *Polygamia Diœcia*, Linn., *Diœcia triandria*, Persoon.—Nat. ord. *Scabridæ*, Linn., *Urticeæ*, Juss.

The fig-tree.

Off.—The preserved fruit.

FRUCTUS FICUS CARICÆ. Fructus siccatus. *Ed.*
FRUCTUS CARICÆ. *Dub.* Fructus exsiccatus. *Lond.*

THIS tree is probably a native of Asia, but grows plentifully in the south of Europe. The fresh fruit is very pulpy, but when dried is easily preserved without any other preparation. In this country figs are chiefly brought from the Levant. They consist almost entirely of sugar and mucilage, and are therefore demulcent. They also form a very convenient suppurating cataplasm, either roasted or boiled, and applied as hot as can be borne to parts where other cataplasms cannot easily be kept applied.

FRAXINUS ORNUS. *Lond. Ed. Dub.* See MANNA.

FUCUS VESICULOSUS. *Lond. Dub.*

Murray, *g.* 1205, *sp.* 8.—Nat. ord. *Algæ*, Linn. Juss.

Off.—Yellow bladder wrack.

FUCUS. *Lond.*

QUERCUS MARINA, herba fructibus præsentibus. *Dub.*

THIS is one of the most common sea-weeds found on our shores. Its value in the manufacture of kelp is well known. In medicine it is little used; though Dr Russel recommended the mucus of the vesicles as a resolvant, when applied externally to scrofulous swellings. The charcoal obtained by burning it in close vessels has in some places got the name of *Æthiops vegetabilis.* It used to be considered merely as a compound of charcoal and carbonate of soda, and as such was neglected; but it contains also *iodine*, and since Dr Coindet's discovery of *iodine* as a specific in bronchocele and strumous affections, its effects are deserving of being again studied.

Galbanum gummi resina. *Lond. Dub.* See Bubon.

Galla, ex variis quercus speciebus. *Ed.*
Gallæ, Cynipidum nidi. *Dub.*
Gallæ, Cynipis quercusfolii nidus. *Lond.*

Nutgalls, the nest of the cynips quercusfolii.

Olivier has, in his travels in the Ottoman Empire, given us an accurate botanical description of the oak which produces the nut-gall. He calls it *Quercus infectoria.* It is scattered through all Asia Minor. It has a crooked stem, and seldom reaches the height of six feet. It oftener has the appearance of a shrub than of a little tree. The gall-nuts come at the shoots of the young boughs, and are produced by the puncture of *diplolepsis gallæ tinctoriæ* to deposite an egg. They acquire from four to twelve lines in diameter, and are generally round and covered with tuberosities. They are in perfection when they have acquired their full size and weight, but before the insect has pierced them, after which they get a brighter colour, and lose some of their weight. The galls first picked are laid apart, and are called *Black* and *Green* galls. Those gathered later are called *White* galls, and are very inferior in value. In commerce they occur of different sizes, smooth or knotty on the surface, of a whitish, reddish, or blackish colour, and generally penetrated with a small hole. Internally they consist of a spongy, but hard, more or less brown substance, and they have a very rough astringent taste. Good galls are of a blackish grey, or yellow colour, heavy, and tuberculated on the surface. They are the most powerful astringents we possess; and since the discovery of the tanning principle by Mr Seguin, have very much engaged the attention of chemists. But the most minute analysis is that of Sir H. Davy, who found that 500 grains of good Aleppo galls gave, by lixiviating them until their soluble matters were taken up, and evaporating the solution slowly, 185 grains of solid matter, which, when examined by analysis, appeared to consist of,

Tannin,	130
Mucilage, and matter rendered insoluble by evaporation,	12
Gallic acid, and a little extractive matter,	31
Remainder, calcareous earth and saline matter,	12

From my experiments, I am disposed to think that Sir H. Davy has under-rated the tannin of nut-galls; for by simple repeated infusions in hot water, the residuum of 500 grains in one experiment amounted only to 158, and in another only to 136 grains. The quantity of tannin, estimated in Sir H. Davy's method, amounted in the first to 220 grains, and in the second to 256. The great difference in these results from Sir H. Davy's must be entirely ascribed to some differences in the galls themselves, or in the mode of operation. A saturated decoction of galls, on cooling, deposites a copious pale yellow precipitate, tannate of starch. In my experiments, a very weak infusion of nut-galls was precipitated by sulphuric acid, lime-water, sub-carbonate of potass, acetate of lead, sulphate of copper, nitrate of silver, sulphate of iron, tartrate of antimony, nitrate of mercury, infusion of cinchona, opium, and many other vegetable substances, and solution of gelatin; it was not precipitated by nitrous acid, ammonia, sulphate of zinc, muriate of mercury, solution of quassia, or infusion of saffron. To what principles these precipitates are owing remains still to be ascertained. Sir H. Davy has concluded that tannin and gelatin unite in fixed proportions, viz. 46 of tannin with 54 gelatin: were this correct, it would very much facilitate the analysis of astringents, but unfortunately my experiments and those of Dr Bostock do not confirm it. The precipitate of tannin and gelatin, in boiling water, becomes soft and viscid, and a certain portion is dissolved, which separates again when the solution cools. I may also remark, that if the precipitate be dried without any heat, it has a yellowish white appearance, opaque, and without lustre; but if exposed to a very moderate increase of temperature before it be dry, it seems to undergo a kind of watery fusion, and acquires transparency, a dark brown-red colour, and a resinous lustre. Sir H. Davy discovered that it is soluble in excess of gelatin. It is also extremely soluble in ammonia, forming a red solution.

Medical use.—An infusion or decoction of galls may be used with advantage as an astringent gargle; and an ointment of one part of finely powdered galls to eight of any simple ointment is applied with success in hæmorrhoidal affections.

GAMBOGIA. Gummi resina ex Stalagmitide Cambogioide et quibusdam aliis arboribus. *Ed.*

GAMBOGIA. Gummi resina Stalagmitidis Cambogioidis. *Dub.*

GAMBOGIA. Stalagmitis Cambogioides Gummi resina. *Lond.*

GAMBOGE; a gum-resin obtained from the Stalagmitis Cambogioidis and some other trees.

ALTHOUGH there be no doubt that gamboge is the concrete juice of a tree, or perhaps of trees belonging to the natural family of *Guttiferæ* of Juss., botanists are not agreed about the individual. The British colleges following the authority of Koenig, name *Stalagmitis cambogioides*, which Persoon now ranks among the *Polyandria monogynia*; while Persoon, Richard, Decandolle and others name the *Garcinia cambogia*, which is a congenerous tree belonging to *Dodecandria monogynia*. But Dr White, who was well acquainted with this tree, distinctly denies that its concrete juice has the properties of gamboge. Some of the rind of the fruit of another species, *G. mangostana*, was sent to me as a native remedy in dysentery, upon which portions of a yellow concrete juice are adhering, apparently more resinous than true gamboge. In Siam, from which unexplored country all the genuine gamboge comes, the gum-resin is obtained in drops by breaking the leaves and young shoots; hence probably its name Gummi-gutta. Gamboge, or at least a very similar substance, is also got in the same way from different species of Garcinia, and from different species of Hypericum, especially the Bacciferum.

Gamboge is brought from the East Indies in large cakes or rolls. The best sort has a deep yellow or orange colour, shining fracture, and is free from impurities. It has no smell, and very little taste, unless after being kept in the mouth for some time, when it impresses a slight sense of acrimony.

Gamboge is a gum-resin, characterized by several peculiarities. It contains no volatile oil. It is not fusible by heat, and it is easily and entirely diffusible through water, forming a yellow emulsion, from which the colouring matter subsides very slowly. It is almost entirely soluble in alcohol, forming a golden-yellow tincture, which is decomposed by water, forming an emulsion as above. It is entirely soluble in ammoniated alcohol, and this solution is not decomposed by water. It is soluble in alkaline solutions, acquiring a deep red colour, and also in acids; but the acid solution is decomposed by water, and yields a yellow precipitate in combination with a proportion of the acid.

Medical use.—Gamboge acts powerfully on the alimentary canal, and is often given as a purgative when the bowels are torpid. Some dread its use as apt to produce hypercatharsis or vomiting.

It is used in dropsy with cream of tartar or jalap, or both, to quicken their operation. It is an ingredient, and probably the active one, in most of the nostrums for expelling tæniæ; and it has been given by some in this disease, to the extent of fifteen grains, with an equal quantity of vegetable alkali. This dose is ordered in the morning; and if the worm is not expelled in two or three hours, it is repeated even to the third time with safety and efficacy.

GENISTA. *Dub.* See SPARTIUM.

GENTIANA LUTEA. *Ed. Lond. Dub.*

Willd. *g.* 512, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Rotaceæ,* Linn., *Gentianeæ,* Juss.

Gentian.

Off.—The root.

RADIX GENTIANÆ LUTEÆ. *Ed.*
RADIX GENTIANÆ. *Lond. Dub.*

GENTIAN is a perennial plant which grows upon the Alps, Pyrenees, Apennines, and other mountainous situations in the temperate parts of Europe.

The roots are long, thick, externally of a brown colour, and wrinkled: internally spongy, and of a yellow colour, without any remarkable smell, but surpassing in bitterness all other European vegetables. Alcohol dissolves only the bitter extractive, water both the extractive and mucilage.

Neumann got from 960 grains 390 alcoholic, and afterwards 210 insipid watery extract; and inversely, 540 watery, and only 20 alcoholic.

Its bitterness depends upon a new principle discovered by Henri and Caventou called *Gentianin,* and is easily obtained in a crystalline form by means of ether, in which it is very soluble. It likewise dissolves in alcohol, and more sparingly in water. It appears to be neither alkaline nor acid.

Medical use.—Gentian possesses the general virtues of bitters in an eminent degree, and it is totally devoid of astringency. On dead animal matter it acts as an antiseptic. Taken into the stomach, it proves a powerful tonic, and in large doses it evacuates the intestines. It is useful in weakness of the stomach, and in general debility. Externally, its powder is applied to putrid ulcers. Narcotic effects have sometimes been ascribed to it, but these are owing to the roots of aconite or belladonna gathered along with it.

GEOFFROYA INERMIS. *Dub.* Geoffræa inermis. *Ed.*
Willd. *g.* 1362, *sp.* 3. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ*, Linn., *Leguminosæ*, sect. *Papilionaceæ*, Juss.

Cabbage tree.

Off.—The bark.

CORTEX GEOFFRÆÆ INERMIS. *Ed.*
CORTEX GEOFFRŒÆ. *Dub.*

THE bark of this tree, which grows in the low savannahs of Jamaica, is of a grey colour externally, but black and furrowed on the inside. The powder looks like jalap, but is not so heavy. It has a mucilaginous and sweetish taste, and a disagreeable smell.

Medical use.—Its medical effects are much greater than its sensible qualities would lead us to expect. When properly exhibited, it operates as a powerful anthelmintic, especially in cases of lumbrici. It is given in form of powder, decoction, syrup, and extract, but should always be given in small doses. The decoction is preferred; and is made by slowly boiling an ounce of the fresh dried bark in a quart of water, till it assume the colour of Madeira wine. This sweetened is the syrup; evaporated it forms an extract. It commonly produces some sickness and purging; sometimes violent effects, as vomiting, delirium and fever. These last are said to be owing to an over-dose, or to drinking cold water; and are relieved by the use of warm water, castor oil, or a vegetable acid.

GEUM URBANUM. *Dub.*
Willd. *g.* 1002, *sp.* 3, Smith, *g.* 237, *sp.* 1. *Icosandria Polygynia.*—Nat. ord. *Senticosæ*, Linn., *Rosaceæ*, sect. *Fragariæ*, Juss.

Common avens. Herb Bennet.

Off.—The root.

RADIX GEI URBANI. *Dub.*

AVENS is a common perennial plant in shady uncultivated places, and flowers from May to August. The root is fibrous, externally of a dark red colour, internally white, and has the flavour of cloves, with a bitterish astringent taste. It must be dug up in spring, when the leaves begin to appear. It tinges both water and alcohol red. Water distilled from it has a pleasant flavour, and carries over a little thickish essential oil. It has been recently analyzed by Melandri and Moretti, who got from two ounces 118 grains of tannin, 181 extractive, 61 of saponaceous extract and saline matter, 92 of mucous extract, 23 of resin, 496 of woody fibres, and 76 of volatile oil, water and loss.

Medical use.—Avens is an old febrifuge mentioned by Ray, but again brought into notice by Buckhave. Half a drachm or a drachm of the powder may be given four times a-day. Two table spoonfuls of the decoction may be given every hour, or a table spoonful of a tincture, made with an ounce of the root to a pound of alcohol, three or four times a-day. As an indigenous astringent it deserves notice.

GLYCYRRHIZA GLABRA. *Ed. Lond. Dub.*

Willd. *g.* 1366, *sp.* 4. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ*, Linn., *Leguminosæ*, sect. *Papilionaceæ*, Juss.

Liquorice.

Off.—The root and the extract.

a) RADIX GLYCYRRHIZÆ GLABRÆ. *Ed.*
RADIX GLYCYRRHIZÆ. *Lond. Dub.*
b) EXTRACTUM GLYCYRRHIZÆ GLABRÆ. *Ed.*

LIQUORICE is a perennial plant, and a native of the south of Europe; but the roots, which are raised for medical purposes in considerable quantities in England, are preferred to those imported from abroad, which are very frequently mouldy and spoiled. The roots are very long, about an inch thick, flexible, fibrous, externally of a brown colour, internally yellow, and when fresh, juicy. Their taste is very sweet, combined with a slight degree of bitter when long kept in the mouth. They are prepared for use by peeling them, cutting away all the fibres and decayed parts. It is necessary to preserve them in a very dry place, as they are extremely apt to spoil.

The powder of liquorice usually sold is often mingled with flour, and perhaps also with substances not so wholesome. The best sort is of a brownish yellow colour, the fine pale yellow being generally sophisticated, and it is of a very rich sweet taste, much more agreeable than that of the fresh root.

Robiquet obtained from liquorice root, 1. Amylaceous feculum; 2. A saccharine substance having little resemblance to sugar; 3. A new crystalline substance; 4. A resinous oil, which is the cause of the acrimony in the decoctions; 5. Phosphate and malate of lime and magnesia; 6. Woody fibre.

The sweetness of the liquorice root depends upon a peculiar principle discovered by Robiquet, and called by him *Glycyrrhizin* or *Glycion.* He prepared it by subjecting a strong cold infusion of the root to ebullition, which separated a coagulable matter. It was then filtered, and acetic acid added, which gradually threw down an abundant, transparent, gelatinous magma, which being washed with a little cold water to separate any adhering acid, he considered as pure *Glycion.* When dry, it is a friable substance, of a dirty yellow colour; but when obtained by slow evaporation from its solution in alcohol, it exists as small, soft, elastic yellow plates. Its taste is peculiar and intensely sweet, and its smell is not perceptible unless thrown on hot coals, when it is resinous rather, than like caromel. It is sparingly soluble in cold water, but readily in hot, and gelatinizes on cooling. It is readily soluble in alcohol even without heat, and it is incapable of the vinous fermentation.

Medical use.—Its predominant constituents being saccharine and mucilaginous matter, its only action is that of a mild demulcent, and as such it is frequently used in catarrh, and in some stomach complaints, which seem to arise from a deficiency of the natural mucus which should defend the stomach against the acrimony of the food, and the fluids secreted into it.

On account of its bulk it is rarely exhibited in substance, but more frequently in infusion or decoction.

Extract of Liquorice.

As this extract is never prepared by the apothecary, but commonly imported from other countries, the Edinburgh College have inserted it in their list of materia medica. It is imported in cylindrical rolls, covered with bay leaves. It should be perfectly black, brittle when cold, and break with a smooth and glassy fracture, have a sweet taste, without empyreuma, and be almost entirely soluble in water. It is prepared from the fresh roots by expression, decoction, and inspissation.

The best foreign extract of liquorice is prepared in Catalonia. The refined liquorice sold in the shops, in small cylindrical pieces, not thicker than a goose-quill, is a composition with mucilage or glue.

Neumann got from 480 parts of Spanish extract, 460 watery extract, and the residuum was not affected by alcohol. The extract possesses the same properties with the root, and is used for the formation of several kinds of troches.

GRANATI CORTEX. *Lond. Dub.* FLORES. *Dub.* See PUNICA.

GRATIOLA OFFICINALIS. *Ed. Dub.*

Willd. *g.* 49, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Personatæ*, Juss.

Hedge-hyssop.

Off.—The plant.

HERBA GRATIOLÆ OFFICINALIS. *Ed.*

HERBA GRATIOLÆ. *Dub.*

THIS is a perennial plant, a native of marshy situations in the south of Europe. It is gathered for use when in flower. It has no smell, but a very bitter, somewhat nauseous taste.

Vauquelin has analysed hedge-hyssop. Its expressed juice contains, in a state of solution, 1. A brown gummy matter; 2. A particular resinous matter extremely bitter; 3. A small quantity of animal matter; 4. Muriate of soda, and perhaps malate of potass. What remains after expression, contains malate and phosphate of lime and iron, probably in the state of phosphate. M. Vauquelin thinks, that the active and purgative ingredient is the substance soluble in alcohol, which he has called a resinoid, as it is the only one possessing taste. Its solubility in water, which is increased by the gum and salts, explains why the infusion, and still more the decoction, are drastic purgatives.

Medical use.—It is a drastic purgative and emetic, but its use requires caution. In substance it may be given to the extent of half a drachm, and in infusion to three drachms. It has been given in worms, dropsy and mania.

GUAIACUM OFFICINALE. *Ed. Lond. Dub.*

Willd. *g.* 819, *sp.* 2. *Decandria Monogynia.*—Nat. ord. *Gruinales*, Linn., *Rutaceæ*, Juss.

Guaiac.

Off.—The wood and resin.

a) LIGNUM GUAIACI OFFICINALIS. *Ed.*
LIGNUM GUAIACI. *Lond. Dub.*
b) RESINA GUAIACI OFFICINALIS. *Ed.*
RESINA GUAIACI. *Lond.*
GUMMI-RESINA GUAIACI. *Dub.*

DEPARTMENT,
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This tree is a native of the West Indies, and grows to a middling size. In 1508, the wood was first used in Spain for the cure of syphilis, under the title of *Santo legno.* In 1517, its use was extended to Italy, and soon after 1518 to Germany, by Ulrich von Hutten.

The wood is heavier than water, very hard, resinous, and of a greenish-black colour. It is found in the shops only in the state of raspings or shavings, which have a yellow colour, and are marked with greenish or bluish-green spots, and acquire a bluish green by exposure to the fumes of nitrous acid, which is a characteristic of their being genuine. Its taste is bitterish, and when kindled it gives out a pleasant smell. It is brought either in pieces which are sometimes covered with a pale yellow alburnum, or already rasped, when by division its colour appears greenish brown, or yellow. The bark is thin, of an ash-grey, or blackish colour, and is less resinous than the wood. Neumann got from 7680 parts of the wood, 1680 alcoholic, and 280 watery extract; and inversely 740 watery, and 960 alcoholic. From 3840 of the bark he got 560 alcoholic, and 320 watery; and inversely, 620 watery, and 240 alcoholic. As guaiac wood is used only in decoction, its virtues must depend upon principles soluble in water. Pfaff found the decoction yellowish, colour not affected by the air or nitrous acid, nor does it precipitate tannin or tartar-emetic, and is rendered only a little darker by sulphate of iron. It impresses the fauces with a durable pricking sensation. Dr Geiger got 5 oz. 3 dr. of thick extract from 3 lb. avoirdupois of the wood.

The resin exudes spontaneously in tears, but is principally obtained by sawing the wood into billets about three feet long, which are then bored with an augre longitudinally. One end of these is laid upon a fire, so that a calabash may receive the melted resin, which runs through the hole as the wood burns. It may be also obtained by boiling the chips or sawings of the wood in water and muriate of soda. The resin swims, and may be skimmed off.

Guaiac resin has a brownish yellow colour externally; when held against the light it is transparent, breaks with an uniform smooth shining fracture, of a bluish green colour, is pulverizable, and the powder has a white colour, gradually becoming bluish-green; is fusible in a moderate heat, but not softened by the heat of the fingers; without proper smell or taste, but when thrown on hot coals diffusing an agreeable odour, and when swallowed in a state of minute division, causing an insufferable burning and pricking in the throat. Its specific gravity is 1.23 or 1.20. Mr Brande of London has investigated this substance with much care. Digested with water, about one-tenth of it is dissolved, the water acquiring a sweetish taste and greenish-brown colour. The liquid, when evaporated, leaves a brown substance soluble in hot water and alcohol, but scarcely in sulphuric ether, and precipitating the muriates of alumina and tin. Buchner thinks this is derived from particles of the bark torn off with the resin. Alcohol readily forms with guaiac a deep brown-coloured solution, decomposed by water, and precipitated green, brown, or pale blue by acids. It is also soluble in ether and alkaline leys and in sulphuric acid. Nitric acid converts it into oxalic acid. On being burnt it leaves a large proportion of charcoal. Dr Wollaston has discovered that by exposure to the air and light it acquires a green colour. This effect is produced in the greatest degree by the most refrangible rays. In the least refrangible rays it is disoxidized, and the yellow colour is restored. It gives a blue colour to the gluten of wheat flour, and to vegetable matters containing gluten, and to mucilage of gum arabic and to milk. It is sometimes adulterated with colophony or common resin; but the fraud is easily detected by the smell of turpentine emitted when thrown on live coals.

Med. use.—Taken internally, guaiac commonly excites a sense of warmth in the stomach, a dryness of the mouth, with thirst. It increases the heat of the body, and quickens the circulation. If the patient be kept warm, it produces diaphoresis; if exposed freely to the air, an increased flow of urine. In large doses it is purgative.

Guaiac is a useful remedy,

1. In rheumatism and gout.
2. In certain venereal symptoms; as in foul indolent ulcers, and a thickened state of the ligaments or periosteum, remaining after the body is reduced by a mercurial course. Guaiac will also suspend the progress of some of the secondary symptoms.
3. In cutaneous diseases.
4. In ozæna, and scrofulous affections of the membranes and ligaments.

The wood is always exhibited in decoction. It contains the acrid extractive.

The resin may be exhibited,

1. In substance, made either into pills, or suspended in water in the form of an emulsion. In this way, from 10 to 30 grains of the resin may be taken in the day.

2. In solution; in alcohol. About half an ounce of the tincture, with three ounces of water, is a sudorific dose for an adult, if he attend to keep himself warm.
3. Combined with an alkali.

GUMMI ARABICUM. *Dub.* See ACACIA.

GUMMI TRAGACANTHA. *Dub.* See ASTRAGALUS.

HÆMATOXYLON CAMPECHIANUM. *Ed. Dub. Lond.*

Willd. *g.* 830, *sp.* 10. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ*, Linn., *Leguminosæ*, sect. *Cassiæ*, Juss.

Logwood.

Off.—The wood.

LIGNUM HÆMATOXYLI CAMPECHIANI. *Ed.*
LIGNUM HÆMATOXYLI. *Lond. Dub.*

THIS tree was introduced from the Honduras into Jamaica, where it is now very common. The wood is firm, heavy, and of a dark red colour. Its taste is sweet, with a slight degree of astringency. It forms a precipitate with a solution of gelatin, very readily soluble in excess of gelatin, and with sulphate of iron it strikes a brighter blue than any other astringent I have tried. Its colouring principle was isolated by Chevreul, who, by the successive action of water and alcohol, obtained it in the form of crystals, and called it *Hæmatin.* It is reddish, crystallizable, bitter, soluble in water and alcohol; waters solution yellow when cold, orange-red when boiling; renders purplish by alkalies, and reddish-yellow by sulphuric acid.

It is used principally as a dye-wood, but also with considerable advantage in medicine. Its extract is sweet and slightly astringent; and is therefore useful in obstinate diarrhœas, and in chronic dysentery.

HELENIUM. *Lond.* See INULA.

HELLEBORASTER. *Dub.* See HELLEBORUS FŒTIDUS.

HELLEBORUS ALBUS. *Dub.* See VERATRUM ALBUM.

HELLEBORUS.

Willd. *g.* 1089, *Smith*, *g.* 256. *Polyandria Pologynia.*—Nat. ord. *Multisiliquæ*, Linn., *Helleboraceæ*, Juss.

Sp. 2. Willd. HELLEBORUS NIGER. *Ed. Lond. Dub.*
Black hellebore.
Off.—The root.

RADIX HELLEBORI NIGRI. *Ed. Lond.* MELAMPODIUM. *Dub.*

THIS plant, which was formerly called *Melampodium*, is perennial, and grows wild in the mountainous parts of Austria, and on the Pyrenees and Apennines. The earliness of its flowers, which sometimes appear in December, has gained it a place in our gardens.

The roots consist of a black furrowed roundish head, about the size of a nutmeg, from which short articulated branches arise, sending out numerous corrugated fibres, about the thickness of a straw, from a span to a foot in length, deep brown on the outside, white or yellowish-white within, and of an acrid, nauseous and bitterish taste, exciting a sense of heat and numbness in the tongue, and of a nauseous acrid smell. These fibres only are used in medicine, and the head and decayed parts are rejected. For the roots of the real black hellebore, those of congenerous plants, especially the Aconitum neomontanum, are often substituted. This is a most virulent poison, and may be distinguished by its roots being fusiform, or nearly globular, sending out numerous very brittle fibres, of a greyish-black or brown colour, as thick as a man's finger, and repeatedly divided. But the surest way to avoid mistakes is by the apothecary cultivating the plant itself in his own garden.

Neumann got from 2880 grains 380 alcoholic and 181 watery extract; and inversely, 362 watery, and 181 alcoholic. Its active constituent seems to be of a volatile nature; for it loses its virtues by keeping, and water distilled from it has an acrid taste.

Medical use.—In large doses hellebore is a drastic purgative; in smaller doses, it is diuretic and emmenagogue. It has been used as a purgative in cases of mania, melancholy, coma, dropsy, worms and psora, and as an emmenagogue. But its use requires very great caution, for its effects are very uncertain, and affected by many circumstances.

It may be exhibited in the form of extract, although its activity be much dissipated by the preparation. An infusion and tincture certainly promise to be medicines of more uniform powers. Willdenow says, that the black hellebore of the ancients is his fifth species, the *Helleborus orientalis*.

Sp. 6. Willd.; *sp.* 2. *Smith.* HELLEBORUS FŒTIDUS. *Lond. Dub.*

Bears foot. Stinking hellebore. Settiswort.

Off.—The leaves.

FOLIA HELLEBORI FŒTIDI. *Lond.*
FOLIA HELLEBORASTRI. *Dub.*

THIS species is a native of England. It is perennial, grows in shady places, and under hedges, and flowers in March and April. The leaves have an acrid, bitter, nauseous taste, and unpleasant smell, especially when they are fresh. When dried, they are sometimes given as a domestic medicine to destroy worms; but they must be used sparingly, being so violent in their operation, that instances of their fatal effects are recorded.

HIRUDO MEDICINALIS. *Dub.*

The Leech.

Cl. Vermis. Ord. *Helmintheca.*

ONLY one species of leech is used in medicine. It has a flat and slimy body, composed of rings, tapering towards the head, which is turbinated, commonly about two or three inches long, and of the thickness of a goose-quill, but capable of elongating or contracting itself very much. Its back is of a dull olive-green colour, divided into three nearly equal parts by four yellow longitudinal lines, the two lateral entire, the two central broken with black. Besides these, between the lateral and central lines on each side, there are two others, resembling a chain of black and yellow. The belly is turkey blue, irregularly marked with yellow spots. It attaches itself to solid substances by either end, being furnished with a circular sucker at the anal extremity, and a horse-shoe one at the head, with a triangular mouth in the centre.

They should be collected in summer, in waters having a clear sandy bottom, as the bite of those found in stagnant waters and marshes is said to cause pain and inflammation. For the same reason, the horse-leech, which is entirely brown, or only marked with a marginal yellow line, is commonly rejected, although they are used frequently in the North of Europe, and during the late scarcity of leeches have occasionally been employed, without any bad consequences, in this country. The vulgar story of their drawing the whole blood out of the body, by evacuating it at one end as fast as they sucked it in at the other, if true, would give them a superiority over the others, as when a sufficient quantity of blood was drawn, there could be no difficulty in making them quit, even without passing a ligature round their necks.

Leeches are best preserved for use in a bottle half filled with pure spring or river water, and covered with gauze or muslin, although they are said not to die even in an exhausted receiver, or in a vessel filled with oil. It is advisable frequently to change the water in which they are kept, although there are instances of their living many months, and even years, in the same water; and it is remarkable that water, in which they are, keeps much longer sweet than by itself. It is scarcely necessary to observe, that whenever the water becomes turbid, or foul, or gets an unpleasant smell, or any of the leeches dies in it, it should be changed. They should always be kept in a moderate temperature, about 50° Fahr. Some recommend throwing a little bran into the water; but it is so well ascertained that they will live for years without any such addition, that it is better not to attempt to feed them, until we are better acquainted with their natural food. Though apparently so hardy, leeches are sometimes subject to great mortality, from unknown causes, as in 1798 and 1799. Infection in some cases seems evident. To avoid danger from this source, they should be kept in several small vessels, rather than in one large reservoir; and when fresh leeches are procured, they should always be kept by themselves, and their health ascertained, before they are added to the general stock. When they have gorged themselves with blood, they frequently die of indigestion, and cause a great mortality even among those which have not been used. To avoid this danger, leeches, which have recently sucked, should also be kept by themselves, until they have recovered their usual vigour. The treatment of the individuals which have performed their office has been the subject of some controversy. One recommends using no means to make them disgorge the blood they have sucked, but only to immerse them for half an hour in milk-warm water, and to change their water regularly every second day for some time; others advise stripping them, as it is called, that is, taking hold of the tail between the finger and thumb of the left hand, and drawing the animal through those of the right, so as to evacuate the blood; while others, again, apply salt to their heads, until they vomit all the blood they have sucked. Leeches change their skin frequently. At that time they are subject to indisposition, and will not bite. The removal of the old cuticle may sometimes be assisted by wiping them with a bit of soft linen.

Medical use.—Leeches are a very old and useful remedy in every case requiring local blood-letting.

They are used,

1. In the headach of continued fever, when venesection is not advisable. In fever with epigastric tenderness, *Gastroenterite.*
2. In inflammation of all kinds, ophthalmia, phrenitis, cynanche, rheumatisms, odontalgia, podagra.
3. In some cases of rubeola and scarlatina.
4. In suppressed natural or habitual hæmorrhagies, especially piles.
5. In plethora of the head, chincough, in mania from suppressed discharges.
6. Dysuria phlogistica.

The application of leeches is sometimes attended with difficulty. When changing their skin, they will not bite, and are averse to it in cloudy rainy weather, and in the evening. When kept out of the water some minutes before they are applied, and allowed to crawl on dry linen, they are said to bite more eagerly. The part to which they are to be applied should be very well washed, first with soap and water, and afterwards with water, or milk and water, and if covered with strong hairs, it should be shaved. When they are not inclined to bite, the part may be moistened with milk, or a little blood drawn from it by a scratch with a lancet. When they fix, they inflict, without causing much pain, a wound of three minute flaps, meeting at equal angles, from which they suck blood until they are gorged, and drop off spontaneously, or are forced to quit their hold by sprinkling on them a little salt. A large leech will draw about an ounce of blood; but the quantity may be much increased by bathing the wounds with tepid water, or applying over them large poultices of bread and milk, or cupping glasses. Sometimes it is even difficult to stop the bleeding; but it will always cease on applying a little lint, and continuing pressure a sufficient length of time, and more easily by touching the wound with lunar caustic.

HORDEUM DISTICHON. *Ed. Dub. Lond.*
Willd. *g.* 151, *sp.* 3. *Triandria Digynia.*—Nat. ord. *Gramina,* Linn. Juss.

Barley.

Off.—The decorticated seed called Pearl-barley.
SEMINA HORDEI DISTICHI. Semina decorticata. *Dub. Ed.*
SEMINA HORDEI. Semina tunicis nudata. *Lond.*

BARLEY is an annual plant, cultivated in almost every country of Europe. Linnæus says that it is a native of Tartary, but without adducing sufficient proof.

Pearl-barley is prepared by grinding off the husk of rough barley, and forming the grain into little round granules, of a pearly whiteness. In this state, barley consists almost solely of amylaceous matter; when boiled it forms an excellent article of nourishment; and a decoction of it, properly acidulated, is one of the best beverages in acute diseases.

Barley meal, according to Fourcroy and Vauquelin, contains starch, sugar, a little unctuous coagulable oil, an animal substance partly soluble in water, and partly forming glutinous flocculi; phosphate of lime and magnesia, silica, iron, and a little acetic acid.

HUMULUS LUPULUS. *Lond.*
Willd. *g.* 1795, *sp.* 415. Smith, *g.* 415, *sp.* 1. *Diœcia Pentandria.*—Nat. ord. *Scabridæ,* Linn., *Urticeæ,* Juss.

Hop.

Off.—The strobiles dried.
STROBILI HUMULI. Strobili siccati. *Lond.*
STROBILI HUMULI LUPULI.

THE hop is an indigenous climbing plant with a perennial root, cultivated to a great extent in Kent, and some other counties in England, for its leafy strobili, which are used in the brewing of ale and porter; and as a very considerable revenue arises from the duty imposed on them, the use of all other bitters, such as quassia, &c. is prohibited by act of Parliament; as, indeed, hops themselves once were. In the north of Europe, the young shoots are eaten instead of asparagus.

Hops are intensely bitter, aromatic, and astringent. By simple infusion the aroma is extracted; by short boiling the bitter, and by long-continued boiling, the aroma is dissipated, and the astringency predominates. The aroma resides in a volatile oil, and the astringency in a species of tannin, for sulphate of iron is blackened by it. It also contains a resin from which it has its bitterness, and a nauseous mucilaginous extractive, which alcohol precipitates from the infusion.

Crystals of nitrate and muriate of potash appear in a long kept extract. The virtues of the hop are found concentrated in small grains of a greenish colour, which are secreted upon the inside of the leafy calyx, and may be separated by beating and sifting. This powder has been called *Lupulin*, which is not an immediate principle, but an organic compound of tan, wax, a bitter principle, resin and lignin. The old writers say, that hops are added to malt liquors on account of the lithontriptic virtues which they were supposed to possess. Their evident effects are to impart an aromatic bitter, and to retard the acetous fermentation; for malt liquors keep longer in proportion to the quantity of hops added, and the bitterness decreases as the liquor becomes ripe, and disappears as it verges to acidity. Bergius supposes that the sweetness of the malt would hurt the stomach, were it not corrected by the bitterness of the hop. It also probably communicates a narcotic quality. A pillow stuffed with hops is said to have long been a popular remedy, and later experiments have confirmed the fact, and led to the employment of various preparations of hops in medicine. The dose of the powder is about three grains, although it may be remarked that it is very difficult to powder. It produced sleep, in the experiments of Dr De Roches, in rheumatic, syphilitic, and pectoral complaints. The tincture seemed to possess the same anodyne virtues, but it was not so uniform in its action. Dr Maton gave it in the form of tincture and extract with the best effect, in articular rheumatism. He did not observe that it had any influence in relaxing the bowels, but the contrary; and he is disposed to believe that the pulse is reduced in frequency, and increased in firmness, by this medicine, in a very direct manner. An ointment compounded with the hop is said, by Mr Freake, to have eased the violent pain in the last stage of cancer, when all other applications were ineffectual.

HYDRARGYRUM. *Dub. Lond.*
HYDRARGYRUS. *Ed.*
Mercury. Quicksilver.

MERCURY is very bright white; specific gravity 13.568; freezing at —39°; boiling at 660°; when frozen, ductile and malleable; oxidizable by trituration in the air, and in a farther degree by the action of the air and heat; does not decompose water; forms amalgams with many metals; and is oxidized and dissolved by the sulphuric, nitric and oxymuriatic acids. Oxides black, red.

It is found in its metallic state:

a. Uncombined. Native mercury.
b. Alloyed with silver.
c. Combined with sulphur, (Cinnabar.)
d. Combined with carburetted sulphur.
e. Combined with muriatic acid. Corneous mercury.

There are considerable mines of mercury in Hungary and in Spain; and what is employed in England is principally imported from the former country.

Mercury, taken into the stomach in its metallic state, has no action on the body, except what arises from its weight or bulk. It is not poisonous, as was vulgarly supposed, but perfectly inert; but, in its various states of combination, it produces decided sensible effects. It quickens the circulation, and increases all the secretions and excretions. According to circumstances, the habit of the body of the patient, the temperature in which he is kept, the nature of the preparation, and the quantity in which it is exhibited, its effects are indeed various; it sometimes increases one secretion more particularly, sometimes another; but its most characteristic effect is the increased flow of saliva which it generally excites, if given in sufficient quantity.

Mercury, or some of its preparations, is exhibited,

1. As an errhine. The sub-sulphate of mercury.
2. As a sialogogue. Mercury, in almost any form.
3. As a cathartic. The sub-muriate of mercury, (calomel.)
4. As a diuretic. The oxides, the muriate, and the sub-muriate, combined with other diuretics.
5. As a sudorific. Calomel, conjoined with a sudorific regimen.
6. As an emmenagogue.
7. As an astringent. Muriate of mercury.
8. As a stimulant. Muriate of mercury.
9. As an antispasmodic.
10. As an anthelmintic.

With some of these views, mercury is frequently exhibited,

1. In febrile diseases; in continued fevers and obstinate agues.
2. In inflammatory diseases; in indolent and chronic inflammations, especially of the glandular viscera, as the liver, spleen, &c.
3. In exanthematous diseases; variola.
4. In profluvia; in dysentery.

5. In spasmodic diseases; tetanus, trismus, hydrophobia, &c.
6. In cachectic diseases; anasarca, ascites, hydrothorax, hydrocephalus, &c.
7. In impetigines; scrofula, syphilis, lepra, icterus, &c.
8. In local diseases; in caligo corneæ, amaurosis, gonorrhœa, obstipatio, amenorrhœa suppressionis, tumours of various kinds, herpes, tinea, psora, &c.

Mercury occasionally attacks the bowels, and causes violent purging, even of blood. The effect is remedied by intermitting the use of the medicine, and by exhibiting opium. At other times it is suddenly determined to the mouth, and produces inflammation, ulceration, and an excessive flow of saliva. In this case, too, the use of the mercury must be discontinued for a time; when, according to Mr Pearson's advice, the patient should be freely exposed to a dry cold air, with the occasional use of cathartics, Peruvian bark, and mineral acids, and the assiduous application of astringent gargles. On the other hand, the sudden suppression of ptyalism is not without danger. It is most frequently caused by cold liquids being taken into the stomach, or exposure to cold and moisture, while under the influence of mercury. The danger is to be obviated by the quick introduction of mercury, so as to affect the gums, with the occasional use of the warm bath.

Sometimes also a morbid condition of the system occurs during a mercurial course, and tends to a fatal issue. Mr Pearson has termed it Erethismus. It is characterised by great depression of strength; a sense of anxiety about the præcordia; frequent sighing; trembling, partial or universal; a small quick pulse; sometimes vomiting; a pale contracted countenance, a sense of coldness, while the tongue is seldom furred, or the vital or natural functions much disordered. In this state, a sudden or violent exertion of muscular power will sometimes prove fatal. To prevent dangerous consequences, the mercury must be discontinued, whatever may be the stage, extent, or violence of the disease for which it has been exhibited, and the patient must expose himself freely to a dry and cool air, in such a manner as shall be attended with the least fatigue; and in the course of ten or fourteen days, he will sometimes be so far recovered, that he may safely resume the use of mercury.

In some particular habits it also produces an exanthematous disease, which sometimes proves fatal, well known by the names of *erythema* or *eczema mercuriale* and *hydrargyria.*

From many motives, both laudable and culpable, mercury has been tortured into a greater variety of forms than any other article of the materia medica. Of these Swediaur has given a complete table, in the last edition of his works on the venereal disease. It is too long for insertion in this place: I shall therefore give a systematic view of those mercurial preparations only which enter at least one of the British Pharmacopœias.

Mercury is exhibited,

1. Metallic.
    a. Purified by distillation.
        Hydrargyrum purificatum. *D. L.*
        Hydrargyrus purificatus. *E.*
    b. Combined with sulphur.
        1. By trituration,
            Sulphuretum hydrargyri nigrum. *E. D.*
        2. By sublimation,
            Sulphuretum hydrargyri rubrum. *L. D.*
    c. With one proportion of chlorine.
        By sublimation.
        Hydrargyri sub-murias. *L.*
        Sub-murias hydrargyri *mitis* sive *Calomelas.* *E.*
        Sub-murias hydrargyri sublimatum. *D.*
            Pilulæ hydrargyri sub-muriatis. *L.*
    2. By precipitation.
        Sub-murias hydrargyri præcipitatus. *E. D.*
    d. With two proportions of chlorine.
        Murias hydrargyri corrosivus. *E.*
        ——————— corrosivum. *D.*
        Hydrargyri oxymurias. *L.*

II. Oxidized.
    A. Protoxide.
        1. By precipitation, from its solution in nitrous acid, by ammonia.
            Hydrargyri oxidum cinereum. *E. L.*
            Pulvis hydrargyri cinereus. *D.*
                Unguentum oxidi hydrargyri cinerei. *E.*
        2. By trituration.
            a. With unctuous substances.
                Unguentum hydrargyri. *E. D.*
                ——————————— fortius. *L.*
                ——————————— mitius. *L. D.*
                Linimentum hydrargyri. *L.*
                Emplastrum ammoniaci cum hydrargyro. *L. D.*
                ————— hydrargyri. *E. L.*
            b. With saccharine substances,

Pilulæ hydrargyri. *L. D. E.*
c. With carbonate of lime,
Hydrargyrum cum creta. *L. D.*
d. With carbonate of magnesia,
Hydrargyrum cum magnesia. *D.*
B. Peroxide.
1. By the action of heat and air.
Oxydum hydrargyri. *D.*
Hydrargyri oxydum rubrum. *L.*
2. By the action of nitrous acid,
Oxidum hydrargyri rubrum *per acidum nitricum. E.*
Oxydum hydrargyri nitricum. *D.*
Nitrico-oxydum hydrargyri. *L.*
Unguentum oxidi hydrargyri rubri. *E.*
——— subnitratis hydrargyri. *D.*
——— hydrargyri nitrico-oxydi. *L.*
III. Oxidized and combined with acids;
A. Protoxide.
1. With nitrous acid:
a. Unguentum hydrargyri nitratis. *L.*
——— supernitratis hydrargyri. *D.*
——— nitratis hydrargyri fortius, *vulgo* Unguentum citrinum. *E.*
b. Unguentum nitratis hydrargyri mitius. *E.*
2. With sulphuric acid:
Sub-sulphas hydrargyri flavus. *E.*
Oxydum hydrargyri sulphuricum. *D.*
3. With acetic acid:
Acetas hydrargyri. *E.*
Acetis hydrargyri. *D.*
B. Peroxide.
1. With muriatic acid.
Liquor hydrargyri oxymuriatis. *L.*
2. Submuriate with ammonia,
Submurias hydrargyri ammoniatum. *D.*
Hydrargyrum præcipitatum album. *L.*
Unguentum sub-muriatis hydrargyri ammoniati. *D.*
Unguentum hydrargyri præcipitati albi. *L.*

HYOSCYAMUS NIGER. *Ed. Lond. Dub.*

Willd. *g.* 378, *sp.* 1. Smith, *g.* 99. *sp.* *Pentandria Monogynia.*—Nat. ord. *Solaneæ*, Linn. Juss.

Common henbane.

Off.—The herb and seeds.

a) HERBA HYOSCIAMI NIGRI. *Ed.*
FOLIA HYOSCIAMI. *Lond.*
HERBA HYOSCIAMI. *Dub.*

b) Semina hyosciami nigri. *Ed.*
Semina hyosciami. *Lond.*

Henbane is an annual plant, which grows in great abundance in most parts of Britain, by the road sides, and among rubbish, and flowers in July. Its smell is strong and peculiar, and, when bruised, something like tobacco, especially when the leaves are burnt; and, on burning, they sparkle, as if they contained a nitrate: when chewed, however, they have no saline taste, but are insipid, mild, and mucilaginous. Its virtues depend upon a peculiar alkaloid principle, discovered by M. Brandes, and called *Hyosciamia.*

Med. use.—From the writings of Dioscorides and others, it appears, that different species of henbane have been long used in the practice of medicine. By Celsus it was applied externally as a collyrium in ophthalmia; for allaying the pain of the toothach; and he gave it internally as an anodyne.

Its use, however, was for a long period entirely relinquished, until revived by Dr Störk of Vienna, in those cases where an anodyne is requisite, and where there are objections to the use of opium; and it is now very much employed.

In a moderate dose, it often produces sweat, and sometimes an eruption of pustules, and generally sound sleep, succeeded by serenity of mind, and recruited vigour of the body; but like the other narcotics, instead of these, it sometimes gives rise to vertigo, headach, and general uneasiness. With particular individuals, it occasions vomiting, colic pains, a copious flow of urine, and sometimes purging. In excessive doses, its effects are fatal; general debility, delirium, remarkable dilatation of the pupils of the eyes, convulsions, death. Upon the whole, like opium, it is a powerful anodyne; and, like cicuta, it is free from any constipating effect, having rather a tendency to move the belly.

It is employed in wandering rheumatic pains, in indurations of the mammæ from retained milk, painful swellings, whether scirrhous or not, scrofulous and cancerous ulcers, inflamed piles, and spasms of the bowels from increased irritability; under the form of a cataplasm of the bruised leaves, with bread and milk; of an ointment, made of the powder of the leaves, with wax and oil; of a simple powder, sprinkled on the sore, or of a decoction in milk as an injection. An infusion prepared by digesting the bruised leaves in olive oil is also usefully applied in inflammation of the bowels, kidneys, testicles, urethra, painful retention of urine, and in blind piles.

An extract from the leaves, or from the seeds, is the form in which it is given internally; and it has been used with advantage in a variety of nervous affections, as mania, melancholia, epilepsy, hysteria, trismus, and spasms from injured nerves, in rheumatism and arthritis, in glandular swellings, in obstinate ulcerations, and in every case where it is desirable either to allay inordinate action, or to mitigate pain. Its dose may be gradually increased from half a grain. Collin pushed it to the length of 30 grains for a dose.

The extract of henbane has been lately much used by oculists for dilating the pupils of the eyes, in order to facilitate the extraction or breaking down of the cataract, to diminish sensibility, to destroy adhesions, to reduce protrusions of the iris, and to dilate contraction of the pupil. The mode of application is by dropping a few drops of solution of the extract into the eye, or applying them with a camel's hair brush. The greatest effect is produced in about four hours, and it is generally over in twelve. Vision is not impaired during its action.

HYSSOPUS OFFICINALIS. *Ed. Dub.*

Willd. *g.* 1096, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

Hyssop.

Off.—The herb and leaves.

HERBA HYSSOPI OFFICINALIS. *Ed.*
FOLIA HYSSOPI. *Dub.*

HYSSOP is a perennial herb which grows wild in Germany. Its leaves have an aromatic smell, and a warm pungent taste. Its virtues depend entirely on an essential oil which rises in distillation both with water and with alcohol. Besides the general virtues of aromatics, its preparations were formerly recommended in humoral asthmas, coughs, and other disorders of the breast and lungs, and were said to promote expectoration.

JALAPÆ RADIX. *Lond.* See CONVOLVULUS.

ICHTHYOCOLLA. *Dub.*

Isinglass.

ISINGLASS is prepared from many species of Acipenser. The Dublin College specify the *A. sturio* or Beluga, and the

A. Ruthenus or Sterlet, besides which a great deal is obtained from the *A. sturio*, the Sturgeon, and *A. stellatus*, the Serruga.

The preparation of isinglass is almost peculiar to Russia. That prepared from the sturgeon is reckoned the best, and next to it, that from the beluga. It also varies according to the mode of preparation. On the Volga and Ural, the sounds are watered while fresh, and dried to a certain degree. The outer skin is next taken off, and the inner glossy white membrane is twisted, and then completely dried. The best is usually rolled into the form of a snake or heart; the second folded in leaves like a book; and the worst is dried without any care. In other places, as at Gurief, fish-glue is extracted from the sounds by boiling. This is cut into slabs or plates, is perfectly transparent, and has the colour of amber. On the Okka, where the sterlet only is to be had, the sounds are beat just as they are extracted from the fish, and dried into glue.

Good isinglass is white, in some degree transparent, dry, composed of membranes, not too thick, and without any smell.

The properties of isinglass depend entirely on the gelatin, of which it principally consists. One hundred grains of good isinglass were found by Mr Hatchett to contain rather more than ninety-eight of matter soluble in water. A nutritious jelly may be prepared from it. A watery solution of it is used as a test of the presence of tannin, and for the clarification of spiritous liquors. Sir H. Davy's solution for the former purpose consists of 120 grains of isinglass dissolved in twenty ounces of water; and if properly made, it has a tendency to gelatinize, at temperatures below 50° F.

It is employed in the preparation of English court-plaster.

INULA HELENIUM. *Dub. Lond.*

Willd. *g.* 1489, *sp.* 1. Smith, *g.* 369, *sp.* 1. *Syngenesia superflua.*—Nat. ord. *Compositæ radiatæ*, Linn., *Synantheræ*, sect. *Corymbiferæ*, Juss.

Elecampane.

Off.—The root.

ENULA CAMPANA; radix. *Dub.*
HELENUM radix. *Lond.*

THIS is a very large downy perennial plant, sometimes found wild in moist rich soils. It flowers in July and August. The root, especially when dry, has an agreeable aromatic smell: its taste, on first chewing, is glutinous, and, as it were, somewhat rancid; in a little time it discovers an aromatic bitterness, which by degrees becomes considerably acrid and pungent.

Neumann got from 480 grains of the dry root, 390 watery, and 5 alcoholic extract; and inversely, 150 alcoholic, and 300 watery. In distillation, alcohol elevated nothing; but the distilled water was first observed by Geoffroy to be milky, and mixed with flocculi of a cineritious concrete fusible volatile oil, partly swimming, and partly sinking in the water, which he compares to camphor or benzoic acid. This root has also been discovered by Rose to contain a matter having some analogy with starch, called *Inulin.* It is a white powder, insoluble in cold, but readily soluble in hot water; insoluble in alcohol; burns with the smell of caromel, and yields oxalic acid when treated with nitric acid.

According to Funke's analysis, elecampane root contains, 1. A crystallizable volatile oil; 2. A peculiar feculum; 3. An extractive matter; 4. Free acetic acid; 5. A crystallizable resin; 6. Albumen; 7. Fibrous matter. The ashes contain carbonates of lime and of magnesia, silica, and a trace of iron.

Medical use.—It is a gently stimulating medicine, nearly similar in its action to angelica. The extract is merely a slight bitter, as the essential oil is totally dissipated in the preparation.

IPECACUANHA.

RADIX IPECACUANHÆ. *Ed.*

RADIX IPECACUANHÆ. Callicocca Ipecacuanha. Brotero, Transactions of the Linnæan Society, vol. vii. *Lond. Dub.*

IPECACUAN, in the language of South America, means vomiting root, and is applied to various vegetables which possess that property in any remarkable degree; hence the confusion and contradictions which have long prevailed concerning the plant which furnishes our officinal Ipecacuan; and this confusion is increased by several varieties of Ipecacuan being found in the shops. Gomez, Richard, Sprengel, and lastly Martins, have added to our botanical knowledge of the vomiting roots.

1. The common brown ipecacuan grows in Brazil, and is exported from Rio Janeiro to Portugal. Its colour varies with different tints of gray or brown, but it is characterized by being contorted, wrinkled, and unequal in thickness; having a thick bark deeply fissured transversely, covering a

central very small wood, so as to give the idea of a number of rings strung upon a thread. This is the root of a *Cephaëlis,* which is perennial, and grows in moist shadowy situations. A monography, with a plate, which agrees with the old figure of Piso, was published, from the information of M. Gomez, in the sixth volume of the Transactions of the Linnæan Society, by Professor Brotero, who calls it the *Callicocca Ipecacuanha ;* but the genus *Callicocca* has been united by Willdenow with that of *Cephaëlis.*

2. The black or striated ipecacuan is a native of Peru, and is exported from Carthagena to Cadiz. It is black within and without, fusiform, articulated, striated, and not annulated. It is the root of the *Psycotria emetica.*

3. The white ipecacuan, called amylaceous by M. Merat, has been well described by M. Gomez. It is of a dirty white, and turns brown by drying; is simple or little branched, often 5 or 6 lines thick, 3 inches long and upwards, attenuated at its extremities, variously contorted, with transverse annular rugosities, but larger than those of the brown ipecacuan bark, thick, white, internally softer than the other; wood white, hard, fine as a thread: when fresh taste acrid, when dried farinaceous; smell nauseous when recent. It is the root of *Richardsonia Brasiliensis,* and is exported to Portugal.

Besides these, the name of ipecacuan is given to various species of *Cynanchum, Asclepias, Euphorbia, Dorstenia,* and *Ruellia.* With regard to their comparative strengths, Decandolle says, that vomiting is produced by 22 grains of the *Cynanchum Ipecacuanha,* 24 of the *Psycotria emetica,* 60 to 72 of the *Viola calceolaria,* and one to three drachms of the *Viola Ipecacuanha.*

Brown ipecacuan was first brought into Europe about the middle of last century, and an account of it published about the same time by Piso; but it did not come into general use till about the year 1686, when Helvetius, under the patronage of Lewis XIV., introduced it into practice.

Neumann got from 7680 parts, 1440 alcoholic, and afterwards 1880 watery extract; and inversely, 2400 watery, and 600 alcoholic. MM. Magendie and Pelletier have found that the *Psycotria emetica, Callicocca ipecacuanha,* and *Viola emetica,* contain a common principle, to which they have given the name of *Emetin.* It forms transparent scales of a brownish red colour, has almost no smell, taste bitter, a little acrid, but not at all nauseous. It is slightly deliquescent in moist air, very soluble in water, soluble in alcohol, insoluble in ether, soluble in muriatic and phosphoric acids, very soluble in acetic acid, precipitated by infusion of nutgalls, by the acetate and especially the sub-acetate of lead, and is not acted upon by tartar emetic, or the salts of iron. *Emetin* is prepared by submitting the powdered ipecacuan first to the action of pure ether, which removes a fatty matter. The residuum is then boiled in alcohol at 0.817. The solution on cooling deposites waxy matter; afterwards filtered it yields a saffron red extract, containing emetin, wax, fatty matter and gallic acid. From this extract, water dissolves the emetin and gallic acid, and the latter is then to be removed by carbonate of barytes, or magnesia, or alumen in a gelatinous form. MM. Magendie and Pelletier ascertained that emetin is powerfully emetic, and has a specific action on the lungs and mucous membrane of the intestinal canal. It is also narcotic; and in large doses poisons dogs, by producing inflammation of the lungs and digestive canal. Four grains dissolved in four ounces of water, given in divided doses, are sufficient for an adult.

Medical use.—The primary effect of ipecacuan is that of stimulating the stomach. If the dose be sufficiently large, it excites vomiting, by inverting the peristaltic motion of the stomach and duodenum; in a smaller dose it only produces nausea, and operates by stool; and in a still smaller dose it gently stimulates the stomach, increases the appetite, and facilitates digestion. Its secondary effects depend on the sympathy of other parts with the stomach; and in this way only can we explain its action as an antispasmodic, diaphoretic, expectorant, and in checking hæmorrhagies. Its beneficial effects, in some cases, also seem to be owing to the general concussion given to the whole system during the action of vomiting.

Ipecacuan, properly administered, often proves serviceable.

1. In intermittent fevers. It has frequently succeeded in stopping these, when given about an hour before an accession was expected, and also when given so as to produce vomiting at the time of an accession, or at the end of the cold stage.

2. In continued fevers. We have never seen more decidedly beneficial effects from the use of any medicine whatever, than from the exhibition of ipecacuan in the precursory stage of typhus fever. An emetic, succeeded by diluent diaphoretics, when administered sufficiently early in the disease, very frequently cuts it short; and when it fails in this

desirable object, it always has a beneficial influence on the progress of the fever.

3. In inflammatory diseases, rheumatism, bubo, swelled testicle.
4. In exanthematous diseases, when the eruption is disposed to recede.
5. In hæmorrhagies, when given in nauseating doses.
6. In profluvia, especially in dysentery, so much so, that it was formerly esteemed a specific against that disease. But Cullen attributes its good effects, in this instance, to its producing a steady determination of the peristaltic motion of the intestine downwards, when given in repeated small doses.
7. In many spasmodic diseases; in epilepsy, asthma, dyspnœa, pertussis, chronic diarrhœa, hysteria, melancholy, mania.
8. In cachectic diseases, as in some kinds of dropsy.
9. In impetiginous diseases; in jaundice.
10. In local diseases; in amaurosis, and several of the dysorexiæ.
11. Lastly, in every instance when we wish to evacuate the stomach, as when it is overloaded with food, or when poison, especially opium, has been swallowed.

The use of ipecacuan, as an emetic, is contra-indicated,

1. Where there is a disposition to hæmorrhagy.
2. Where there is an increased flow of blood towards the head.
3. In very irritable subjects.
4. In pregnant women, and persons afflicted with hernia.

Ipecacuan is exhibited,

1. In substance, in powder. Full vomiting will generally be produced in an adult by a scruple or half a drachm; and though less might answer the purpose, fortunately an overdose is scarcely attended with any inconvenience, as the whole of it is vomited with the contents of the stomach as soon as it operates. The vomiting is promoted and facilitated by drinking copiously of warm diluents. On the contrary, when vomiting is not intended, liquids must be rather drunk sparingly, and the dose must be diminished to a grain or less. In such small doses it is conveniently combined with any proper adjunct, in the form of powder, pill, or bolus.

2. In infusion. One drachm may be infused in four ounces of water, and taken in repeated doses till it operate.
3. Infused in wine.

Ipecacuan not only checks the narcotic effects of opium, and is therefore one of the best antidotes for its poison, but reciprocally the emetic powers of ipecacuan are checked by the addition of opium, and the combination operates by increasing the cuticular discharge.

IRIS FLORENTINA. *Ed.*

Willd. *g.* 97, *sp.* 7. *Triandria Monogynia.*—Nat. ord. *Ensatæ*, Linn., *Irideæ*, Juss.

Off.—The root. Florentine Orris.

RADIX IRIDIS FLORENTINÆ.

THIS is a perennial plant, a native of the south of Europe. The dried roots are imported from Italy. They are white, flattish, knotty, and have a very slightly bitter taste, and an agreeable smell, resembling that of violets.

Neumann got from 480 parts, 77 alcoholic, and afterwards 100 watery, and inversely 180 watery, and 8 alcoholic extract. The distilled water smells a little of the root, but exhibits no appearance of oil. They are chiefly used as a perfume, and chewed to conceal the smell of mercury in the breath.

JUNIPERUS.

Willd. *g.* 1841. Smith, *g.* 421. *Diœcia Monadelphia.*—Nat. ord. *Coniferæ*, Linn. Juss.

Sp. 10. Willd. *sp.* 1. Smith, JUNIPERUS COMMUNIS. *Ed. Lond. Dub.*

Common juniper.

Off.—The berries and tops.

a) BACCÆ JUNIPERI. *Lond. Dub.*
BACCÆ JUNIPERI COMMUNIS. *Ed.*
b) CACUMINA JUNIPERI. *Lond.*

THIS is an evergreen shrub, growing on heaths and hilly grounds in all parts of Europe. It flowers in May. The berries are chiefly brought from Holland and from Italy. The Italian berries are in general reckoned the best. Juniper berries have a strong, not disagreeable smell, and a warm pungent sweet taste, which, if they are long chewed, or much bruised, is followed by a bitterish one. Their predominant constituents are essential oil, and a sweet mucilaginous matter.

Medical use.—To the oil they are indebted for their stimulating, carminative, diaphoretic, and diuretic properties. They are most commonly used in the form of infusion, as a diuretic drink in dropsy. The essential oil may be separated by distillation. It possesses the same properties in a higher degree, and imparts them to ardent spirits. The peculiar flavour and well-known diuretic effects of Hollands are owing to the oil of juniper. The decoction and extract are very inert preparations of the class of bitters.

Every part of the plant contains the same essential oil; therefore an infusion of the tops is likewise diuretic.

The wood also was formerly officinal. In warm countries a resin exudes from the juniper-tree. It is called sandarac, and is often mixed with mastich. It is not a pure resin; for, according to Mr Giese, about one-fifth of it is not soluble in alcohol, but in ether, resembling in these respects copal.

Sp. 6. JUNIPERUS SABINA. *Ed. Lond. Dub.*
Savine.

Off.—The leaf.

FOLIA JUNIPERI SABINÆ. *Ed.*
FOLIA SABINÆ. *Lond. Dub.*

THIS is an evergreen shrub, a native of Siberia and Tartary, but not unfrequent in our gardens. The leaves have a bitter, acrid, biting taste, and a strong disagreeable smell: distilled with water, they yield an essential oil in considerable quantity.

Medical use.—Savine is a warm stimulating medicine, capable of producing diaphoresis, and increasing all the secretions, but apt to excite hæmorrhagy, especially from the uterus. It is also recommended as an anthelmintic, and is said to be very efficient in the cure of gout.

Internally, a conserve of the fresh leaves is exhibited in doses of from half a drachm to a drachm.

Externally, the leaves are applied in the form of powder or infusion to warts, carious bones, and old ulcers, and in cases of gangrene, psora, and tinea; an excellent issue ointment is also prepared by boiling the leaves in oil. The essential oil is a very active remedy, and said to produce abortion.

Sp. 14. JUNIPERUS LYCIA. *Ed. Lond. Dub.*
Olibanum.

Off.—A gum resin.

GUMMI-RESINA JUNIPERI LYCIÆ. *Ed.*
OLIBANUM; gummi resina. *Lond. Dub.*

OLIBANUM is principally collected in Arabia, and brought from Mecca to Cairo, from whence it is imported into Europe. It consists of transparent brittle grains of different sizes, not larger than a chesnut, of a red or yellow colour, having little taste and a peculiar aromatic smell. Neumann got from 480 grains, 346 alcoholic, and 125 watery extract, and inversely, 200 watery, and 273 alcoholic. The distilled spirit and water both smelt of olibanum, but no oil separated. Olibanum forms a transparent solution with alcohol, and a milky fluid when triturated with water: it is not fusible, but inflammable, and burns with an agreeable smell. It is said to be the frankincense of the ancients; and the diffusion of its vapour around the altar still forms part of the ceremonies of the Greek and Roman catholic churches.

KINO. Succus spissatus Eucalypti resiniferæ. *Ed.*
KINO; Butea frondosa. *Dub.* See BUTEA.
KINO. Pterocarpi erinaceæ extractum. Encyclop. Method. *Lond.*

KINO, the inspissated juice of the brown gum-tree of Botany Bay. The resin of the Butea frondosa. The gum-resin of the hedgehog pterocarpus.

Kino was first noticed by Dr Fothergill, who received it from a druggist as a very fine kind of dragon's blood, and described it as the produce of an African tree called the *Pau de Sangue*. Since that time many different substances have been from time to time in commerce as kino, and those which were at one period most common are afterwards neglected, and are no longer to be obtained. Hence a great deal of confusion exists in regard to this substance.

Kino, however, may be distinguished as derived from two very different sources; the one being natural concrete juices; the other artificial extracts. The former are generally characterized by having rather a heterogeneous appearance, mixed with bits of bark or leaves; and partially marked with the impression of a bark, and translucent on the edges of small fragments. The extracts are characterized by being almost homogeneous, and marked with the impression of some vessel in which they have been consolidated, and are opaque even in their fragments.

Varieties of Kino.

a. Concrete Juices.

1. *African Kino.*—In Moor's travels up the Gambia, there is a very imperfect account of Pau de Sangue from which it exudes, and a copy of directions from the African company to their factors, to collect and purchase this gum; but it seems to have been brought to them only in very small quantities, and mixed with gum Senegal. This kind is probably no longer to be met with in commerce, at least it is not mentioned by Mr Jackson among the exports from Mogodore, or by Mr Winterbottom in his account of Sierra Leone. Dr Paris probably alludes to this variety when he says, "The plant which yields kino is at length satisfactorily proved to be the *Pterocarpus crinacea;*" and the London College have adopted this source, and referred to the *Encyclopedie Methodique.* In that great work, vol. v. p. 808, however, I find a botanical description of the tree, but no intimation that it yields kino, although it may be the case. The London College certainly err in describing this variety as an extract. They might with equal propriety consider opium as an extract.

2. *Botany Bay Kino.*—When I first examined this substance more than twenty years ago, this was common, and was the finest kind in commerce. By Dr A. T. Thomson, we are told, that for the last twenty years none of it has been imported. I may, however, retain my description of it. It occurs in dark brown masses of various sizes, either smooth or rounded on the surface, or in fragments often covered with a reddish brown powder, fracture resinous and very unequal, appearance sometimes homogeneous, but more commonly heterogeneous, mixed with bits of twigs, leaves, &c.; splinters transparent, ruby red; no smell, scarcely crackling under the teeth, but sometimes gritty, from the accidental mixture of sand; taste simply astringent, succeeded by sweetness, and, when long chewed, a portion adheres to the teeth; infusible and friable; powder reddish-brown. This is certainly obtained from the *Eucalyptus resinifera,* or brown gum-tree of New South Wales, by allowing the juice, which either flows from it spontaneously, or is procured by wounding the tree,

to harden in the sun. Some specimens of it in its fluid state have even reached this country.

3. The Dublin College have indicated the *Butea frondosa* as the source of kino, but certainly erroneously. It however produces in large quantities a red juice, very analogous to kino, and which may unquestionably be used as a substitute for it.

4. I picked a portion of a red astringent matter, exactly like kino, from a cavity in a plank of beef-wood, *Cassuarina equisetifolia.*

b. Extracts.

1. One occurs in very small jet-black fragments, perfectly opaque, without smell, crackling under the teeth when chewed, not colouring the saliva, after some time imparting only a slight astringent taste, not fusible, and difficultly reduced to powder. Powder dark chocolate-brown. Although this has been the longest known in commerce in this place, I have not been able to trace the place of its origin. It is evidently an extract, and corresponds very nearly with Dr A. T. Thomson's description of Jamaica kino. It is also scarcely to be distinguished from the extract of the Swietenia Soymida, sent home by Dr Roxburgh; and I am told it is imitated by an extract of oak bark, which is sometimes substituted for kino.

2. The kino imported by the East India Company resembles the preceding in many particulars. It is called Amboyna kino, and is the extract of the *Nauclea Gambir.*

3. In large fragments, on some of which the impression of the vessel into which it had been received while fluid, and in which it had hardened, was evident; colour very dark brown, fracture resinous, appearance homogeneous, with small air bells; in very thin splinters, transparent, and of a ruby red colour: crackling under the teeth when chewed, taste at first somewhat acid, but afterwards becoming considerably bitter and astringent, succeeded by a peculiar sweetness; infusible, and friable; powder of a reddish brown. This I was informed by Dr Wright was the extract of the *Coccoloba uvifera* or seaside grape; and indeed, by comparing it with the specimens of that extract, I have no doubt of the accuracy of my information. The late Dr Murray was told it was the extract of the mahogany wood, which may be also true.

The production of kino from so many different trees in

Africa, America, Asia, and New Holland, shews that kino is to be considered as a genus of which these are species.

The chemical constitution of kino was first published by myself in 1803, in the first edition of this Dispensatory; and my conclusion from these experiments, that it consists principally of tannin, and cannot with propriety be classed among the resins or gum-resins, was confirmed by an analysis which Vauquelin published soon after, without any knowledge of what I had done.

Kino is much more soluble in boiling than in cold water. The decoction, therefore, on cooling, becomes turbid, with a very copious red sediment. Alcohol dissolves the whole of the Botany-bay kino except its impurities. With a certain proportion of water, this tincture lets fall a copious red precipitate, which may be separated by filtration, but with a larger proportion of water its transparency is only slightly disturbed. It is also remarkable, that alcohol dissolves kino entirely, but does not dissolve the residuum of the decoction. The solutions of kino precipitate gelatin, and, according to Vauquelin, silver, lead, and antimony, white; and iron, green. I find that it resembles other astringents, in forming a black precipitate with red sulphate of iron, which however is converted into green by the slightest excess of the sulphate, and by a larger excess is dissolved into a bright green liquid.

Med. use.—Kino is a powerful remedy in obstinate chronic diarrhœas and dysenteries; in all passive hæmorrhagies, especially from the uterus; in fluor albus; and in diseases arising from laxity of the solids.

It is exhibited internally, in doses of from ten to thirty grains, in substance, or dissolved in diluted alcohol.

Externally, it is applied as a styptic, to check hæmorrhagies from wounds or ulcers, and to diminish the discharge of sanious or ichorous matter from ill-conditioned ulcers.

KRAMERIA TRIANDRIA. *Lond.*

Persoon, *g.* 292, *sp.* 1. *Tetrandria Monogynia.*—Nat. ord. *Polygaleæ*, Juss.

Off.—The root. Rhatany root.

KRAMERIÆ TRIANDRIÆ RADIX. *Lond.*

THIS is the root of a shrub growing in Peru, and has been made known to botanists, and introduced into medical practice by M. Ruiz. Its name of rhatany is derived from the growth of the root, which is creeping. As brought in commerce, it consists of cylindrical ramifications, varying in size from that of a quill to a finger. It consists of a bark of a deep brown colour, slightly fibrous, extremely astringent, without bitterness, and a central wood of a reddish yellow, and less taste.

The analysis of rhatany root shews that it is a pure astringent. It is said to contain about 38 *per cent.* of a red astringent matter, differing in some particulars from the tannin of galls. It contains no resinous matter. Gmelin could not detect in it any gallic acid; and Peschier thinks it contains a peculiar acid, which he has called *Krameric*, and which forms crystallizable permanent salts with alkalies. The extract of rhatany root prepared in America can scarcely be distinguished from kino, when an extract. Vogel says that when heated, kino is charred without altering its form, while rhatany extract previously melts and swells very much. But this may be owing to the latter not being so thoroughly dried.

Med. use.—In this respect it agrees with other astringents, and its extract is similar to kino, catechu, and extract of logwood.

LACTUCA. *Ed.*

Willd. *g.* 1404, Smith, *g.* 342. *Syngenesia æqualis.*—Nat. ord. *Compositæ semiflosculosæ*, Linn., *Synantheræ*, sect. *Cichoraceæ*, Juss.

Sp. 12. LACTUCA VIROSA. *Ed.*

Strong-scented lettuce.

Off.—The herb.

HERBA LACTUCÆ VIROSÆ. *Ed.*

THIS plant flowers in August and September, is biennial, and grows wild on rubbish and rough banks in many places in this country.

The whole plant abounds with a milky juice, intensely bitter, considerably acrid, and having a strong virose smell like opium.

Medical use.—An extract prepared from the expressed juice of the leaves of the strong-scented lettuce, gathered when in flower, has been given in dropsies of long standing, proceeding from visceral obstructions, to the extent of half an ounce a-day, but it must have been ill prepared. It is said to agree with the stomach, to quench thirst, to be gently laxative, powerfully diuretic, and somewhat diaphoretic. Plentiful dilution is allowed during its operation. Dr Collin of Vienna asserts, that out of twenty-four dropsical patients, all but one were cured by this medicine.

Sp. Lactuca sativa. *Ed. Lond.*
Garden lettuce.
Off.—The herb and its concrete juice.
a) Herba lactucæ sativæ. *Ed.*
Lactuca. *Lond.*
b) Lactucarium. *Ed.*

This succulent vegetable, which is a valuable sallad, abounds with a cooling, bland and pellucid juice before its flower stem shoots, after that with a milky juice of an intensely bitter taste, which becomes brown on drying by exposure to the air. The juice has been analysed by Mr John of Berlin, and found to consist of water, caoutchouc as its principal solid constituent, a trace of resin, a small quantity of bitter extractive, and phosphates, muriates, and sulphates. According to this analysis, the milky juice of lettuce would seem a very inert substance; as the caoutchouc, which is its principal solid constituent, has no action on the body; but it is evident he overlooked the most active ingredient, which is an alkali analogous to morphia.

Although the soporific power of lettuce was known to the ancients, its effects were first put to the test of experiment by Dr Coxe of Philadelphia; but it is owing to the perseverance and recommendation of Dr Duncan senior, that preparations of lettuce have been admitted into two of the British Pharmacopœias.

Mr Young, surgeon of Edinburgh, has taken great pains to bring the various preparations of lettuce to perfection. To the milky juice obtained by incisions made in the flowering stem, collecting the juice on the finger as soon as it exudes, and speedily dried by exposure to the air, he gives the name of *Lettuce opium*; which is now prepared on a very large scale, and occurs in commerce in round hard masses of a wood brown colour, with a strong virose smell, having a strong resemblance to Turkey opium, but none to an extract. Although the process of Mr Young is that by which, as in opium, the virtues of the plant are obtained in the most natural state, its expense is great, and various attempts have been made to lessen it.

Dr Probart collects the milky juice as it exudes from the cut stem, upon pieces of wove cotton about half a yard square, and from time to time throws them, as they become charged, into a vessel containing a small quantity of water, which when sufficiently impregnated is evaporated by simple exposure in shallow vessels. This process will furnish a very pure extract, and free from the caoutchouc, but it is still expensive. Dr Probart further observed, that after the plants have flowered, and the leaves are beginning to assume a yellow hue, the milky juice assumes a concrete form, and is contained in the bark of the stalks and in the old leaves. He therefore uses these only, which he macerates in water for 24 hours, then boils for two, strains off the decoction without pressure, and evaporates first by heat, and then in shallow dishes. This he calls *Extractum lactucæ concentratum*, which he says is about half the strength of the lactucarium, but obtained at one-sixth of the expense. The term *Lactucarium* is unfortunately applied to different preparations: many give it to what Dr Young calls lettuce opium; Dr Duncan senior uses it for the extract of the tincture of the same substance; Dr Young for its extract obtained by alcohol and water; and Dr Probart to a watery extract.

The remarkable similarity of the taste of shot-lettuce to that of opium, induced Dr Coxe of Philadelphia to make a series of comparative experiments with lettuce opium on frogs, as well as on the human subject. "These experiments were made on frogs as well as on the human subject. The laudanum made from the opium of the lettuce increases the pulse in force and frequency, and produces generally the same effects as result from similar doses of common laudanum. It has been used with advantage in allaying the pain of chronic rheumatism and cholic; in checking the frequent stools accompanying diarrhœa; in allaying cough," &c. &c. Since Dr Duncan senior wrote his treatise on pulmonary consumption, and recommended lactucarium as a substitute for opium, without some of its injurious effects, its use has become very general in all complaints in which anodynes are required.

LAURUS.

Willd. g. 798. *Enneandria Monogynia.*—Nat. ord. *Oleraceæ*, Linn., *Laurineæ*, Juss.

Sp. 1. LAURUS CINNAMOMUM. *Ed. Lond. Dub.*

The cinnamon tree.

Off.—The inner bark and its essential oil.

a) CORTEX LAURI CINNAMOMI. *Ed.*

Cortex cinnamomi. *Dub.* (Liber.) *Lond.*
b) Oleum cinnamomi. Ejus oleum essentiale. *Lond.*
Oleum essentiale cinnamomi. *Dub.*

Sp. 2. Laurus cassia. *Ed. Dub.*
The cassia tree.

Off.—The bark and flower-buds gathered before they open.

a) Cortex lauri cassiæ. *Ed.*
Cortex cassiæ ligneæ. *Dub.*
b) Flores lauri cassiæ. Flores nondum expliciti. *Ed.*
Flores nondum expliciti cassiæ ligneæ. *Dub.*

I have united these two species in one article, not that they are the same, but because the articles called Cassia bark and Cassia buds are in reality the products of the true cinnamon tree, and not of the Laurus cassia, no part of which is used in medicine. For the most accurate information concerning the cinnamon we are indebted to Mr Marshall, who has corrected several errors promulgated by Burmann, Thunberg, and Captain Percival. The tree abounds in many parts of the torrid zone. It seems to be a native of Ceylon, the Malabar coast, and many islands of the Indian and Chinese seas. It has been also introduced with much success into Guaiana, Cayenne, the Brazils, and various West India islands. The cinnamon in commerce is brought chiefly from Ceylon and China. In Ceylon it is collected partly from wild trees growing in the jungles, and partly from trees cultivated in plantations.

The roots are branchy and ligneous. The bark of the roots combines the smell of camphor and cinnamon, and yields camphor by distillation. The wood is light and inodorous The tree grows to the height of 20 to 30 feet, and the trunk is in diameter from 18 to 20 inches. The tree emits no smell. The mature leaves when bruised have a strong aromatic odour, and the biting sharp taste of cloves, but are eaten with great avidity by buffaloes, goats, deer and horses Mr Marshall seems to think that the dried leaves are the *Malabathrum folium* or *folium Indicum* of the ancients. They have an olive yellow colour. "They are shining and glossy; thick, crisp, and durable; the three nerves are protuberant on the inferior side of the leaf; they endure for several weeks the heat and rains of a tropical climate, without losing their spicy aromatic taste; they have in a considerable degree the acridity and flavour of cloves." A specimen of the oil, for which I am indebted to Mr Marshall, cannot be dis tinguished by the taste, smell and gravity from oil of cloves.

“ The cassia bud of commerce is the fleshy hexangular receptacle of the seed of the laurus cinnamomum. When gathered young, the receptacle completely envelops the embryo seed, which progressively protrudes, but continues firmly embraced by the receptacle. The buds have the appearance of nails, with roundish heads of various sizes. If carefully dried, the receptacle becomes nearly black, and the point of the berry light brown. The seeds contract by drying, and often fall out; the receptable is then cup-shaped. When long kept they have a dirty brown colour, and possess very little of the aromatic flavour of cinnamon.” Crows and wood-pigeons devour the berries with great avidity, and contribute to the dissemination of the plant.

Many different kinds of cinnamon bark have been mentioned by preceding authors, but Mr Marshall says the distinctions are arbitrary and comparative, imaginary and ill defined. “ Two peelers rarely ever agree in giving the same denomination to a similar piece of cinnamon. The diversities of the quality of cinnamon do not appear to arise from any varieties of the plant, but from care and skill in its preparation, the soil and exposure of the country, the age and health of the plant. The cinnamon-tree is rarely found except on the south and west aspect of the island. It is chiefly procured between Negombo and Matura: beyond these limits the bark is never of a good quality; it has little taste, and is greatly deficient of the spicy aromatic flavour of cinnamon. Even between these limits the cinnamon is not of the same quality: exposure, soil, shade, and other circumstances, have powerful effects in producing a corresponding variety of the excellences and defects of the produce of the tree.” The peeling commences in May, and continues till late in October. When the peeler perceives a bush with shoots of a proper age for cutting, he tries whether the bark will separate easily from the wood, and when it will not, it is not deemed fit for cutting, and they do not cut shoots or branches whose diameter is much less than half an inch, or more than two or three inches. The epidermis and green matter under it are carefully scraped off, when the bark speedily dries, contracts, and assumes the appearance of a pipe. These are inserted into each other to make them about 40 inches long, and made up into bundles of about 30 lbs. weight. “ When newly prepared, cinnamon has a most delicious odour; this odoriferous quality becomes gradually fainter. Cinnamon is at first a light orange colour, which becomes a shade darker by exposure to the air. The bark of old trees acquires a reddish-brown colour. Shortly after the cinnamon is deposited in the storehouses, the inspection of it commences. The East India Company employ an inspector and two assistants to superintend the sorting and baling of the cinnamon. The manipulation is performed by natives. Each bundle is placed on a table or large bench, the bundle is untied, and the cinnamon examined quill by quill. It is divided into a first, a second, and a third, or rejected sort. The first and second sorts are alone deemed of a quality fit to form the Company's investment. The sorting of cinnamon consists chiefly in detecting or separating what is coarse, and otherwise of a bad quality, including the impositions of the peelers. This is chiefly performed by inspection. Habit soon enables the people employed to discover by a single glance of the eye what is considered defective. Tasting is very rarely had recourse to. The bark of the large shoots, or thick branches of trees, produces coarse cinnamon, which is generally rejected by the sorters. This cinnamon is thick, and has a reddish-brown colour, rough surface, loose texture, and is coarse-grained. It breaks short, shivery, and crumbling. When chewed it is disagreeably pungent, feels gritty, ligneous, and sandy in the mouth. The peelers occasionally scrape off the external pellicle of this quality of cinnamon. This operation thins the cinnamon and improves the colour, but leaves it with a coarse, rough surface. This quality of cinnamon is always rejected. Cinnamon prepared from the bark of very young and succulent shoots is rejected. It is light straw-coloured, thin, and almost without flavour or taste; and what little aroma it possesses is very evanescent. Mildewed or half-rotten and smoky cinnamon is rejected.

That which is considered in Ceylon as of the best quality is of a light yellow colour, approaching nearly to that of Venetian gold; thin, smooth, shining; admits of a considerable degree of pressure and bending before it breaks; fracture splintery; has an agreeable, warm, aromatic flavour, with a mild degree of sweetness. When chewed, the pieces become soft and seem to melt in the mouth. The first and second sorts are weighed, and put up into bundles, each weighing 92½ lb. English. The Company export their cinnamon from Colombo or Galle. The interstices between the bales are filled with black pepper. This mode of packing was generally practised by the Dutch, and has been scrupulously adhered to by the English.

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By distillation with water, cinnamon bark furnishes a small quantity of very pungent and fragrant oil; the water itself remains long milky, and has a strong flavour of cinnamon. The process is simple: the bark is grossly powdered and macerated for two days in sea-water, when both are put into the still. A light oil comes over with the water, and swims upon its surface, and a heavy oil, which sinks to the bottom of the receiver. The light oil separates from the water in a few hours; but the heavy oil continues to precipitate for 10 or 12 days. The heavy oil, which separates first, is about the same colour as the light oil; but the portion which separates last has a browner shade than the supernatant oil. In future distillations the saturated cinnamon-water is advantageously used, added to sea-water, to macerate the cinnamon. 80 lb. of newly prepared cinnamon yield about 2½ oz. of oil, which floats upon the water, and 5½ of heavy oil. The same quantity of cinnamon, if kept in store for several years, yields 2 oz. of light oil, and 5 oz. of heavy oil.

On some occasions the Ceylon Government has directed oil to be extracted from the cinnamon, whose quality did not permit it to form part of the Company's investment. The Dutch were accused of deteriorating their cinnamon by mixing it with a proportion of real cinnamon, but which had been deprived of its essential oil by distillation. This fraud could only be detected by the weaker smell and taste. It is also often mixed with the coarser bark called cassia. This last is easily distinguishable by its fracture being smooth, and by its slimy mucilaginous taste, without any of the roughness of the fine cinnamon.

The watery extract in Neumann's experiment amounted to 720 from 7680 parts. With alcohol the oil does not arise in distillation, but remains in the extract, which amounts to 960. Vauquelin also analyzed it, and obtained volatile oil, tannin, colouring matters, and an acid. He also made a comparative analysis of the Ceylon and Guaiana cinnamon, and found the difference to consist in the oil, which in the latter was much sharper, and in some degree peppery. The oil of cinnamon of commerce independent of adulteration is various. The finest has the pure cinnamon flavour, and the inferior has a considerable admixture of the clove flavour; and when we consider that the leaves yield an oil with that flavour, it is not improbable that the fine oil is furnished by the bark alone, and the inferior oil by a mixture of bark with twigs and leaves.

The essential oil of cinnamon has a whitish-yellow colour, a pungent burning taste, and the peculiar fine flavour of cinnamon in a very great degree. It should be entirely soluble in alcohol. It is principally prepared in Ceylon.

Medical use.—Cinnamon is a very elegant and useful aromatic, more grateful both to the palate and stomach than most other substances of this class. Like other aromatics, the effects of cinnamon are stimulating, heating, stomachic, carminative, and tonic; but it is rather used as an adjunct to other remedies, than as a remedy itself.

The oil is one of the most powerful stimulants we possess, and is sometimes used as a cordial in cramps of the stomach, and in syncope; as a stimulant in paralysis of the tongue, or to deaden the nerve in toothach. But it is principally employed as an aromatic, to cover the disagreeable taste of other drugs.

Sp. 3. LAURUS CAMPHORA. *Ed. Lond. Dub.* See CAMPHORA.

Sp. 10. LAURUS NOBILIS. *Ed. Lond.*

Bay tree.

Off.—The leaves, berries, and expressed oil of the berries.

a) FOLIUM LAURI NOBILIS. *Ed.*
FOLIA LAURI. *Lond.*
b) BACCÆ LAURI NOBILIS. *Ed.*
BACCÆ LAURI. *Lond.*
c) OLEUM FIXUM LAURI NOBILIS. *Ed.*

THIS tree is a native of the south of Europe, but bears the winters of this climate perfectly well. Both leaves and berries contain a considerable quantity of essential oil, which renders them aromatic stimulating substances.

The berries are generally brought from the Mediterranean, and are more pungent than the leaves. In Spain and Italy a considerable quantity of oil is obtained by expression from the fresh berries. It has a green colour, and strong aromatic taste and smell. As it therefore is not a fixed oil, but a mixture of fixed and volatile oil, and as its peculiar properties depend entirely on the presence of the latter, it is incorrectly stated to be a fixed oil by the Edinburgh College. It should rather have been denominated, from the mode of its preparation, an expressed oil.

Medical use.—It is only used externally as a stimulant.

Sp. 34. LAURUS SASSAFRAS. *Ed. Lond. Dub.*
Sassafras.

Off.—The wood, root, and bark.
a) LIGNUM LAURI SASSAFRAS. *Ed.*
LIGNUM SASSAFRAS. *Lond. Dub.*
b) RADIX LAURI SASSAFRAS. *Ed.*
RADIX SASSAFRAS. *Lond. Dub.*
CORTEX SASSAFRAS. *Dub.*

THIS tree is a native of North America, and is cultivated in Jamaica. It is the root which is commonly employed. It is brought to us in long branched pieces. It is soft, light, and of a spongy texture; of a rusty white colour; of a strong pleasant smell, resembling that of fennel; and a sweetish, aromatic, sub-acrid taste. The bark is rough, of a brownish colour on the outside, and ferruginous colour within; spongy and divisible into layers, and of a stronger taste and smell than the wood.

Neumann got from 480 grains, 80 of alcoholic, and afterwards 60 of watery extract, and inversely 120 watery, and 7.5 alcoholic. In distillation, alcohol elevates nothing, but water brings over a ponderous essential oil, in the proportion of about 10 from 480.

Medical use.—Sassafras, from the quantity of volatile oil it contains, is a gently stimulating, heating, sudorific, and diuretic remedy. It is best given in infusion. The decoction and extract are mere bitters, as the oil is dissipated by the preparation.

The essential oil may be obtained separate by distillation. It is of a whitish-yellow colour, and sinks in water. It is highly stimulating and heating, and must be given only in very small doses.

LAVANDULA SPICA. *Ed. Lond. Dub.*
Willd. *g.* 1099, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.
Lavender.

Off.—The flowering spikes.
FLORES LAVANDULÆ SPICÆ. *Ed.*
FLORES LAVANDULÆ. *Lond. Dub.*

LAVENDER is a well-known, small, shrubby, perennial plant, a native of the south of Europe, but frequently cultivated in our gardens, for the sake of its perfume. There are two varieties. The flowers of both have a fragrant, agreeable smell, and a warm, pungent, bitterish taste; the broad-leaved variety yields in distillation thrice as much essential oil as the other; its oil is also hotter, and specifically heavier: hence in the southern parts of France where both kinds grow wild, this only is used for the distillation of what is called *Oil of spike.* The narrow-leaved is the variety commonly met with in our gardens.

Medical use.—Lavender is a warm stimulating aromatic. It is principally used as a perfume.

LEONTODON TARAXACUM. *Ed. Lond. Dub.*

Willd. *g.* 1407, *sp.* 1. Smith, *g.* 344, *sp.* 1. *Syngenesia æqualis.*—Nat. ord. *Compositæ semiflosculosæ,* Linn., *Synantheræ,* sect. *Cichoraceæ,* Juss.

Common dandelion.

Off.—The root and leaves.

a) HERBA LEONTODI TARAXACI. *Ed.*
FOLIA TARAXACI. *Dub.*
b) RADIX LEONTODI TARAXACI. *Ed.*
RADIX TARAXACI. *Lond. Dub.*

THIS perennial plant is very common in grass fields, and uncultivated places. It flowers from April to July. The whole plant contains a bitter milky juice, which, however, is most abundant in the roots before the flower-stem shoots. The bitterness is destroyed by drying, and therefore the recent roots only should be used.

Med. use.—Its vulgar name in all languages shews a popular belief of its possessing diuretic properties; and it was lately a very fashionable remedy in Germany, given in the form of an expressed juice or decoction, or extract prepared from either of them. Since the observations of Dr. W. Philips and Dr Pemberton, the extract has become fashionable in England in some hepatic and dyspeptic complaints. It seems, however, to be merely a mucilaginous bitter.

LICHEN.

Murray, *g.* 1202, *Cryptogamia, algæ, lichenes.*

Sp. 50. LICHEN ISLANDICUS. *Lond. Dub. Ed.*

Iceland moss. Eryngo-leaved liverwort.

Off.—The plant.

LICHEN. *Lond.*
LICHEN ISLANDICUS. *Dub. Ed.*

This is a perennial lichen, very common in Iceland, but also found in the forests and dry sterile woods of Switzerland and Germany, growing upon stones and on the earth. It has dry coriaceous leaves, divided into lobes and laciniæ, which are again notched and subdivided, with elevated margins, beset with short, very minute, rigid, parallel hairs, and marked with white spots, reddish towards the points. Amongst the leaves are found peltated, somewhat excavated, shining, viscid bodies, internally of a brown colour: these are the pericarpiums. When fresh, the colour of this lichen is greenish-yellow, or greyish-brown; but when dried, greenish-white or grey. A variety is found, with smaller, tenderer, crisper leaves, destitute of hairs on the margin, of a paler lead colour, orange beneath. It is gathered in rainy weather, because it is then more easily detached from the stones. In the countries where it abounds, it is used for the nourishment both of cattle and of man. M. Proust has analysed it with much minuteness.

According to his analysis, one hundred parts of dried lichen give, of

Bitter extractive,	3
Matter soluble in hot water,	33
Matter insoluble in hot water,	64 = 100

The last substance has much analogy with gluten, and the second with starch, particularly in the remarkable property of being precipitated by infusion of galls. It differs from it, however, in not being glutinous, and in the solid matter of the jelly contracting and separating from the fluid, as curd does from whey.

Medical use.—From the analysis of this lichen, it appears to consist principally of a nutritious substance, combined with a bitter; and on the combination of these, its medical virtues probably depend. It is used, according to Arnemann,

1. In cough with expectoration, threatening to terminate in consumption; after neglected catarrhs, the consequence of peripneumony, when the expectoration becomes more copious and purulent.
2. In emaciation from measles, (Schoenheide); from wounds and ulcers with great discharge, (Plenk); after salivation; and from actual ulcers in the lungs, when there is no fever, (Scopoli,) especially after neglected colds, or from translated morbid matter. In a high degree of the disease it does little good, but

the night sweats are diminished by it, (Millin.) In pituitous phthisis it is of great service.

4. In hæmoptysis, (Frize.)
5. In chincough, (Tode.)
6. In diabetes, as a tonic and palliative remedy.

It is commonly exhibited in decoction with water, broth, or milk, after the bitter has been extracted from it by steeping it in warm water; or in substance, boiled in chocolate or cocoa, or made into a jelly with boiling water. Half an ounce, or an ounce, must be used daily, and continued for some time. Proust disbelieves its specific virtues, but recommends it strongly as an article of diet in times of scarcity, and as a very convenient antiscorbutic vegetable in long sea-voyages.

Sp. 115. LICHEN ROCELLA. *Dub.*
Orchill.

Off.—Litmus, turnsole.

LITMUS, lacmus tinctorius. *Dub.*

THIS lichen is found in Guernsey and Portland island, but it is from the Canary islands that it is chiefly obtained. It is not sold in the state of the plant merely dried, but manufactured by the Dutch into a paste, called *Litmus, Orseille en pate.* It is sold in square masses, about an inch in length, and half an inch in breadth and thickness, hard and brittle, having the appearance of a violet coloured earth, with white spots. It has a violet smell, probably from the addition of orris root powder; and when tasted, speedily tinges the saliva, and gives a sense of heat in the mouth. This paste is prepared by making the lichen undergo a kind of fermentation in vats with urine and lime-water, forming the whole into a pulp, and then dividing it into squares to dry.

Litmus is chiefly used as a dye-stuff, and by chemists as a very valuable test of the presence of uncombined acids. I must confess my ignorance of the grounds upon which the Dublin College have introduced it into their *Materia Medica.* The translator of the Pharmacopœia merely says, "It has been used medicinally with an intention of allaying the tickling attendant on phthisis, and in hysterical "coughs."

LIMON. *Dub. Lond.* See CITRUS.

LINUM.

Willd. *g.* 590. Smith, *g.* 163. *Pentandria Pentagynia.*—Nat. ord. *Gruinales,* Linn., *Linaceæ,* Juss.

Sp. 1. Willd. Smith. LINUM USITATISSIMUM. *Ed. Lond. Dub.*

Common flax.

Off.—The seed.

SEMINA LINI USITATISSIMI. *Ed. Lond.*
SEMINA LINI. *Dub.*

THIS valuable annual plant is said to have come originally from those parts of Egypt which are exposed to the inundations of the Nile. It now grows wild in the fields in the south of England, and is cultivated in large quantities. It flowers in July.

Linseed contains about one-fifth of mucilage, and one-sixth of fixed oil. The mucilage resides entirely in the skin, and is separated by infusion or decoction. The oil is separated by expression. It is one of the cheapest fixed oils; but is generally rancid and nauseous, and unfit for internal use. The cake which remains after the expression of the oil contains the farinaceous and mucilaginous part of the seed, and is used in fattening cattle, under the name of Oil-cake.

Medical use.—Linseed is emollient and demulcent. The entire seeds are used in cataplasms. The infusion is much employed as a pectoral drink, and in ardor urinæ, nephritic pains, and during the exhibition of corrosive sublimate.

Sp. 26. Willd.; *sp.* 4. Smith. LINUM CATHARTICUM. *Dub. Lond.*

Purging flax. Mill-mountain.

Officinal.—Herba. The herb.

LINUM CATHARTICUM. *Lond.*
HERBA LINI CATHARTICI. *Dub.*

THIS is an annual indigenous plant, found wild on dry meadows and pastures. It flowers from June to August. It is extremely bitter. An infusion in water or whey of a handful of the fresh herb, or a drachm of it in substance, when dried, is said to purge without inconvenience.

LITHARGYRUM. *Dub.* See PLUMBUM.

LITHRUM SALICARIA. *Dub.*

Willd. *g.* 951, *sp.* 1. Smith, *g.* 223, *sp.* 1. *Dodecandria Monogynia.*—Nat. ord. *Calycanthemæ,* Linn., *Salicariæ,* Juss.

Purple-spiked Willowstrife, Loosestrife.

Officinal.—The herb.

HERBA LITHRI SALICARIÆ. *Dub.*

THIS perennial plant is indigenous, and grows in marshes, and on the banks of rivers. The dried leaves have a herbaceous, somewhat astringent taste, and when moistened soon give out a ropy mucilage. Hence it is difficult to swallow the powder mixed with water.

The decoction of this plant has been long celebrated in Ireland in diarrhœas. In the same disease, it is a popular remedy in Sweden; and De Haen and Störk and others have given it with success in laxity of the intestines from an accumulation of sordes. After premising a purgative, a drachm or more of the powder may be given morning and evening, or three times a-day. Its properties are evidently mucilaginous and astringent.

LITMUS. *Dub.* See LICHEN.

LYTTA VESICATORIA. *Lond.* 1809. See CANTHARIS.

MACIS. *Dub.* See MYRISTICA.

MAGNESIÆ SUBCARBONAS. *Lond.*

Subcarbonate of magnesia.

THIS salt, for the preparation of which a formula is given by all the Colleges, is now also introduced into the materia medica by that of London, and with justice, as it is never prepared by the apothecary himself.

In commerce, the greatest part of the carbonate of magnesia is made by mixing solutions of the muriate of magnesia and subcarbonate of ammonia. The former of these salts is procured in a state of solution at the salt works, where it remains dissolved in the liquid in the pan after the muriate of soda has crystallized from the sea water. The subcarbonate of ammonia employed in the manufacture of carbonate of magnesia is used, either pure or impure, as it comes from soot or bones when they are exposed to a strong heat in a retort. The subcarbonate of ammonia is generally preferred to any other carbonate, because it may be recovered from the muriate of ammonia, which, as well as the carbonate of magnesia, is produced by the double decomposition of the muriate of magnesia and subcarbonate of ammonia. Though the most of the carbonate of magnesia is made in the manner now described, the purest is manufactured by mixing solutions of the subcarbonate of potass and muriate of magnesia.

MAGNESIÆ SULPHAS, S. S. Sulphas magnesiæ purificata. *L.*
SULPHAS MAGNESIÆ. *Ed.*
SULPHAS MAGNESIÆ, *olim* Sal catharticum amarum. *Dub.*
Sulphate of magnesia. Epsom salt. Bitter purging salt.

THIS salt is contained in several mineral springs, and also in sea-water, from which it is obtained by evaporation. It crystallizes in tetrahedral prisms, has a very bitter taste, and is soluble in its own weight of water at 60°, and in three-fourths of its weight of boiling water. Sulphate of magnesia effloresces. By the action of heat it undergoes the watery fusion, and loses its water of crystallization, but does not part with its acid. It is decomposed by baryta, strontia, the alkalies, and all the salts formed by these salifiable bases, excepting the alkaline muriates; and by the nitrate, muriate, and carbonate of lime.

Medical use.—It is a mild and gentle purgative, operating with sufficient efficacy, and in general with ease and safety, rarely occasioning any gripes, sickness, or the other inconveniences of resinous purgatives. From one to eight drachms may be dissolved for a dose in a proper quantity of common water. The solution may likewise be so managed as to promote evacuation by the other emunctories; if the patient be kept warm, it increases perspiration: and by moderate exercise in the cool air, the urinary discharge. Some allege that this salt has a peculiar effect in allaying pain, as in colic, even independently of evacuation. It has of late years almost superseded the use of sulphate of soda.

It is also used for the preparation of the carbonate of magnesia.

MAJORANA. *Dub.* See ORIGANUM.

MALVA SYLVESTRIS. *Ed. Lond.*

Willd. *g.* 1290, *sp.* 43. Smith, *g.* 317, *sp.* 1. *Monadelphia Polyandria.*—Nat. ord. *Columniferæ*, Linn., *Malvaceæ*, Juss.

Common mallow.

Off.—The leaves and flowers.

a) HERBA MALVÆ SYLVESTRIS. *Ed.*
MALVA. *Lond.*
b) FLORES MALVÆ SYLVESTRIS. *Ed.*

THIS is a perennial plant, common in Britain, under hedges, near footpaths, and among rubbish. It flowers from May to August.

The whole plant abounds with mucilage. Decoctions of the leaves are sometimes employed in dysenteries, heat, and sharpness of urine, and in general for obtunding acrimonious humours; their principal use is in emollient glysters, cataplasms, and fomentations.

MANGANESIUM. *Dub.*
Manganese; the black oxide of Manganese.

THIS metallic oxide is now, for the first time, introduced into the materia medica. It is to be regretted that the Dublin College has given, as the officinal name of the oxide, that which scientifically belongs to the metal.

Manganese. Small whitish grey globules; specific gravity 6.850; very hard and very brittle; very difficult of fusion; very oxidizable by exposure to air; decomposes water rapidly; is oxidized by the sulphuric and nitric acids; burns when strongly heated in oxygen or chlorine; combines with many metals. According to Berzelius, it forms a sub-oxide, containing two proportions of metal, $3.5 = 7$ and one of oxygen $1 = 8$; three oxides containing 1, 2, and 3 proportions of oxygen to one of metal, and two acids containing 4 and 5 proportions of oxygen to one of metal. These oxides colour glass brown, violet, or red, and destroy the colour of glass coloured by iron.

Manganese is found,

I. Metallic.
  1. Native manganese.

II. Oxidized. Grey ore, containing its black oxide.
  1. Foliated grey ore.
  2. Radiated.
  3. Compact.
  4. Earthy.

III. Sulphuretted. The black ore.

IV. Carbonated. The red ore.

The varieties of the grey ore are the most common. It is found in greatest purity at Exeter, and at Howth near Dublin. It is chiefly used for destroying the colour which iron imparts to glass, and has hence been called Glass-maker's soap, and for preparing the oxymuriatic acid, now so much used in bleaching. The recent application of the same acid to the destruction of contagion, and to other medical purposes, has procured the black oxide of manganese a place in the list of the materia medica.

MANNA. Succus concretus Fraxini orni. *Lond. Dub. Ed.*
Manna, the concrete juice of the manna ash.

THE tree which is indicated as yielding the officinal manna is the *Fraxinus ornus*. Willd. *g.* 1908, *sp.* 15. *Polygamia Diœcia.*—Nat. ord. *Ascyrbideæ*, Linn., *Jasmineæ*, Juss. It is obtained from other species of *fraxinus* besides the *ornus*, and especially from the *rotundifolia*. It is principally collected in Calabria, Apulia, and Sicily. In the warmest season of the year, from the middle of June to the end of July, a clear juice exudes from the stem and branches of these trees, which, when naturally concreted on the plants, and scraped off, is called Manna in the tear; but if allowed to exude on straws, or chips of wood fastened to the tree, it is called canulated or flaky manna. The common or fat manna is got by incisions made after the spontaneous exudation is over, and is in larger masses, and of a redder colour. The best Calabrian manna is in oblong, light friable pieces or flakes, of a whitish or pale yellow colour, and somewhat transparent. The inferior kinds are moist, unctuous, and dark coloured.

Denon, in his travels in Sicily, has given an account of the manna produced there, which, though less known, is dearer than that of Calabria, and preferred to it. The heat of the sun coagulates the frothy juice which exudes, and gives it the form of stalactites.

Olivier mentions different kinds of manna found in Persia, one called *Cherker*, more purgative than Calabrian manna, got from the north of Khorassan and Little Tartary; another very good to eat, which must be collected before sunrise, because it melts with the heat of the sun; and a third, called *Therenjabri*, the product of the *Hedysarum alagi*, in the warmest provinces of Persia and Arabia.

Manna appears often to be formed and deposited by insects. Manna is said to be sometimes counterfeited by a composition of sugar and honey, mixed with a little scammony: there is also a factitious manna, which is white and dry, said to be composed of sugar, manna, and some purgative ingredient, boiled to a proper consistence. This may be distinguished by its weight, solidity and transparent whiteness, and by its taste, which is different from that of manna.

Manna dissolves in alcohol. A saturated hot alcoholic solution on cooling concretes into a perfectly dry, white, spongy, crystallized mass. When much less concentrated, it deposites a congeries of most beautiful snow-white acicular crystals. A saturated solution in boiling water also forms a solid crystallized mass on cooling.

Medical use.—Manna is a mild agreeable laxative, and may be given with safety to children and pregnant women: nevertheless, in some particular constitutions, it acts very unpleasantly, producing flatulency, and distension of the viscera: these inconveniences may be prevented by the addition of any grateful warm aromatic. Manna operates so weakly as not to produce the full effect of a cathartic, unless taken in large doses; and hence it is rarely given by itself with this intention. It may be commodiously dissolved in the purging mineral waters, or joined with the cathartic salts, senna, rhubarb, or the like.

MARMOR ALBUM. *Lond.* See CALX.

MARRUBIUM VULGARE. *Ed. Lond. Dub.*

Willd. *g.* 1111, *sp.* 8. Smith, *g.* 270, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

White horehound.

Off.—The leaves.

HERBA MARRUBII VULGARIS. *Ed.*
FOLIA MARRUBII ALBI. *Dub.*
MARRUBIUM. *Lond.*

THIS is a perennial plant, which grows wild on road-sides, and among rubbish, and flowers in July. The leaves have a very strong, not disagreeable smell, and a roughish very bitter taste. They promote the fluid secretions in general, and, liberally taken, loosen the belly.

MARUM SYRIACUM. *Dub.* See TEUCRIUM.

MEL. *Lond. Dub. Ed.*

Honey.

This is a well-known substance; and although it is most probably of vegetable origin, it is not procured in any quantity except as an animal excretion from the bee (*apis mellifica.*) This industrious insect, in the summer-time, flies from flower to flower, to collect the sweet juice secreted in them. When sufficiently loaded, it returns to its hive, where it deposites the honey, as a supply of winter's food, in the cells of the comb it has prepared of wax to receive it. What change it undergoes in the body of the insect is unknown; but it is certain that honey varies very much, according to the nature of the plants from which it is collected.

The best honey is that which is freest from colour, and contains the largest grains when it concretes. For medical use, it should also be as free of flavour as possible. That obtained from young bees, and which flows spontaneously from the combs, is the purest and finest, and is known by the name of Virgin honey. When separated from the wax by expression, it is less pure; and there is another sort still inferior, obtained by heating the combs before they are put into the press.

Honey consists principally of sugar, but it also probably contains mucilage and an acid, and is often impregnated with the essential oil of the flowers from which the bees have gathered it, as in the perfumed honey of the Crimea. In some parts of Asia and America, poisonous honey is met with from the bees feeding on poisonous flowers. Neumann exsiccated honey in the water-bath: the vapour which arose, he says, took fire on the approach of a candle, and diffused its smell widely; and the liquor which was condensed was manifestly impregnated both with the smell and taste of honey, and amounted to three ounces, from eight of honey. Dissolved in water, it undergoes the vinous fermentation, forming mead. Treated with alcohol, Proust says it may be separated into two kinds of sugar, one liquid, and the other crystalline. Cavellazzi obtained crystals from it, by saturating its acid with carbonate of lime. It is converted into oxalic acid by the action of nitric acid.

Med. use.—From the earliest ages, honey has been employed as a medicine. Besides the general properties of saccharine bodies, it possesses others peculiar to itself, probably depending on the presence of an acid. For internal use, sugar is commonly to be preferred, as honey, in some constitutions, produces gripes and colic pains. From its stimulus, however, it forms an excellent gargle, and facilitates the expectoration of viscid phlegm; and it is sometimes employed as an emollient application to abscesses, and as a detergent to ulcers. It is also preferable to sugar in forming electuaries, as it is not so apt to crystallize.

MELALEUCA LEUCADENDRON. *Ed. Dub.*
MELALEUCA CAJUPUTI. *Lond.*
Willd. *g.* 1428. *Species nova. Polyadelphia Polyandria.* —Nat. ord. *Hesperideæ*, Linn., *Myrtineæ*, Juss.

The broad-leaved cajeput tree.

Off.—The essential oil called Cajeput oil.

OLEUM VOLATILE MELALEUCÆ LEUCADENDRI. *Ed.*
CAJUPUTI OLEUM, oleum essentiale. *Lond.*
OLEUM CAJEPUT. *Dub.*

THE tree which furnishes the cajeput oil is frequent on the mountains of Amboyna, and the other Molucca islands. Drs Maton and Smith have lately examined specimens of this tree, which correspond with Rumphius, tab. 17, vol. ii.; and, as an unclassified species, have named it Melaleuca cajuputi. But, as Thunberg says, it is got from the leucadendron, perhaps both species yield it. Indeed, Rumphius himself would lead us to the same opinion. The oil is obtained by distillation from the dried leaves, and is prepared in great quantities, especially in the island of Banda, and sent to Holland in copper flasks. As it comes to us, it is of a green colour, very limpid, lighter than water, of a strong smell, resembling camphor, and has a strong pungent taste, like that of cardamoms. It burns entirely away, without leaving any residuum. It is often adulterated with other essential oils, coloured with the resin of milfoil. When rectified, it is colourless; but Mr Brande did not detect in any of the specimens which he analyzed, copper, to which its colour used to be ascribed.

Medical use.—Like other aromatic oils, it is highly stimulating, and is principally recommended in hysteria, epilepsy, flatulent colic, and paralysis of the tongue. The dose is from one to four drops on a lump of sugar.

It is applied externally, where a warm and peculiar stimulus is requisite; and is employed for restoring vigour after luxations and sprains; and for easing violent pain in gouty and rheumatic cases, in toothach, and similar affections.

MELISSA OFFICINALIS. *Ed.*
Willd. *g.* 1118, *sp.* 1. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

Balm.

Off.—The herb.

FOLIA MELISSÆ OFFICINALIS. *Ed.*

BALM is a perennial plant, which grows wild on the Alps and Pyrennees, and is frequently cultivated in our gardens. It has a pleasant smell, and a weak, roughish, aromatic taste. The young shoots have the strongest flavour; the flowers, and the herb itself, when old, or produced in very moist rich soils, or rainy seasons, are much weaker, both in smell and taste.

It is principally used in the form of a watery infusion, which is drunk in the manner of tea.

MENISPERMUM COCCULUS. *Ed.*

Willd. *g.* 1826, *sp.* 7. *Diœcia Dodecandria.*—Nat. ord. *Sarmentaceæ,* Linn., *Menispermeæ,* Juss.

Cocculus Indicus.

Off.—The berry.

BACCÆ MENISPERMI COCCULI.

THIS tree is a native of Ceylon, Malabar, Java, and other places of India. The nuts are about the size of large peas, of a grey colour, and wrinkled surface. They contain a kidney-shaped seed, within a very thick shell. 4 ounces of the nut gave 1 ounce of the seeds. The shell has little taste. The seed is intensely bitter, and very acrid. M. Boullay analysed them, and found them to contain about half their weight of a concrete waxy oil, albumen, a particular colouring matter, a new bitter poisonous principle, *Picrotoxia,* lignin, and various saline matters. In later experiments, M. Boullay detected a peculiar acid, to which he has given the name of *Menispermic.* Picrotoxia is obtained by digesting for a day a decoction of the berry upon caustic magnesia. It is then to be treated with alcohol, which dissolves out the picrotoxia, and this may be purified by evaporation and repeating the solution, and if much coloured, by the addition of animal charcoal. It has the form of quadrangular prisms, white, brilliant, semitransparent, and extremely bitter; it is soluble in 3 parts of alcohol, in 25 of boiling, and 50 of cold water. It is soluble in the common alkalies, and in acetic and weak nitric acid. It melts by heat, and chars, and contains no azote. Vauquelin got a substance very similar from the *Daphne alpina.* Picrotoxia resembles camphor in its action, but is much more powerful and deleterious.

Med. use.—The extract has been lately recommended by

M. Fouquier of Paris in paralysis. I have tried it, and found it much less energetic than considering its nature and the small proportion of extract obtained I expected. It seemed to act as a tonic, and to keep the bowels in a good state; but I observed no narcotic or stimulant effects. The cocculus indicus is used to intoxicate fishes, in order that they may be caught; and it is said to be employed by some porter brewers to give bitterness to their beer, and to render it more intoxicating. An ointment made with it has long been a domestic remedy in some places to kill vermin on the head, and is successfully applied in cases of tinea capitis.

MENTHA.

Willd. *g.* 1102. Smith, *g.* 262. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

Sp. 7. Willd. *sp.* 3. Smith. MENTHA VIRIDIS. *Lond. Dub.*

Spearmint.

Off.—The plant.

MENTHA VIRIDIS. *Lond.*

FOLIA MENTHÆ SATIVÆ. *Dub.*

SPEARMINT is perennial, and a native of Britain. It flowers in August. The leaves have a warm, roughish, somewhat bitter taste, and a strong, not unpleasant, aromatic smell. Their virtues are stomachic and carminative.

Sp. 13. Willd. *sp.* 4. Smith. MENTHA PIPERITA. *Ed. Dub. Lond.*

Peppermint.

Off.—The plant.

HERBA MENTHÆ PIPERITÆ. *Ed.*

MENTHA PIPERITA. *Lond.*

HERBA MENTHÆ PIPERITIDIS. *Dub.*

THIS species of mint is also perennial, and a native o Britain, where it is cultivated in very great quantities, fo the sake of its essential oil. It flowers in August and Sep tember.

The leaves have a strong, rather agreeable smell, and pungent, aromatic taste, somewhat resembling that of pep per, and accompanied with a peculiar sensation of coldness. Its predominant constituents are essential oil and camphor both of which rise in distillation, and are combined in wha is called Oil of Peppermint.

Med. use.—Peppermint is principally used as a carminative and antispasmodic. The distilled water is a domestic remedy for flatulent colic, and the essential oil is often given with advantage, in doses of a few drops, in cramps of the stomach.

Sp. 20. Willd. *sp.* 12. Smith. MENTHA PULEGIUM. *Ed. Lond. Dub.*

Penny-royal.

Off.—The herb.

HERBA MENTHÆ PULEGII. *Ed.*
PULEGIUM. *Lond. Dub.*

THIS is also perennial, and a native of Britain. It flowers in September. In its sensible qualities it is warm, pungent, and aromatic, somewhat similar to spearmint, but less agreeable. It is seldom used.

MENYANTHES TRIFOLIATA. *Ed. Lond. Dub.*

Willd. *g.* 299, *sp.* 4. Smith, *g.* 84, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Rotaceæ,* Linn., *Gentianæ,* Juss.

Buckbean, Marsh trefoil.

Off.—The leaves.

FOLIA MENYANTHIS TRIFOLIATÆ. *Ed.*
MENYANTHES. *Lond.*
TRIFOLIUM PALUDOSUM. *Dub.*

THIS perennial plant is very common in marshy situations, and is one of the most beautiful of our native flowers. It flowers in June and July.

The leaves grow, by threes, on footstalks. They are excessively bitter, and their bitterness is extracted by infusion. They are said to be sometimes used in brewing ale, and that one ounce will go as far as half a pound of hops.

Medical use.—A drachm of them in powder purges and vomits. In infusion or extract, they have been recommended in intermittents, and in several cachectic and cutaneous diseases. The dose of the extract is from ten to twenty grains.

MEZEREON. *Dub.* See DAPHNE.

MILLEPEDÆ. *Dub.* See ONISCUS.

MOMORDICA ELATERIUM. *Lond. Dub.*

Monœcia Syngenesia. Willd. *g.* 7139, *sp.* 13.—Nat. ord. *Cucurbitaceæ*, Linn. Juss.

Wild cucumber.

Off.—The fresh fruit when almost ripe.

a) ELATERII PEPONES. Pepones recentes. *Lond.*
ELATERIUM; fructus. *Dub.*
b) ELATERIUM. *Ed.*

THIS plant is a native of the south of Europe, and is perennial. When cultivated in this country it does not survive the winter. The fruit is oblong, about an inch and a half long, and an inch in diameter. It is of a green colour, and beset with stiff hairs. When nearly ripe, it bursts on a slight touch, separates from its stalk, and sheds its seeds with great violence. From this circumstance it was named by the Greeks *Elaterium*, which name was also applied to the only officinal preparation, and in that sense it is now used by the Edinburgh and Dublin Colleges.

Dr Clutterbuck has lately ascertained that the active principle of wild cucumber is contained almost exclusively in the juice around the seeds, and that genuine elaterium is the matter which subsides spontaneously from this juice obtained without pressure. He found that the eighth part of a grain thus prepared seldom failed to purge violently, and of this, according to the experiments of Mr Barry, from 55 to 64 *per cent.* only were soluble in alcohol of 0.809. The chemical constitution of the elaterium of commerce has been investigated by Dr Paris. Alcohol of 0.817 dissolved only 16 *per cent.* and water afterwards 59; inversely water first applied dissolved 40, alcohol afterwards only 5 *per cent.* His results are water 4, extractive 26, fecula (starch) 28, gluten 5, woody matter 25, *elatin* and bitter principle 12. The bitter principle is in itself not purgative, but quickens the action of the elatin when combined with it. Elatin he considers as a new principle, of a green colour, soft, considerably heavier than water, not in the least bitter, inflammable, and burning with smoke and an aromatic odour, insoluble in water, soluble in alcohol, forming a beautiful green solution, from which it is precipitated by water, and soluble in alkalies. In very minute quantities it purges.

Dr Paris says, that when elaterium has a dark green colour approaching to black, is compact and very heavy, and breaks with a shining resinous fracture, we may reject it as an inferior article.

Med. use.—In a few grains it operates as a drastic purgative, and was sometimes used in dropsies. It is high priced and seldom used, though recommended by Dr Ferriar.

MORUS NIGRA.

Monœcia Tetandria. Willd. *g.* 1664, *sp.* 5.—Nat. ord. *Scabridæ*, Linn., *Urticeæ*, Juss.

Mulberry tree.

Off.—The fruit.

BACCÆ MORI. *Lond.*

THIS tree, which is supposed to have come originally from Persia, bears the cold of our winters, and ripens its fruit in England. The fruit has the same properties with other subacid fruits. Its juice contains tartaric acid.

MOSCHUS. *Ed. Dub.* Concretum sui generis. *Lond.*

Musk.

THE musk animal, *Moschus Moschiferus*, is an inhabitant of the most elevated region of Asia, particularly of the Altayan Alps, and the mountains which divide Thibet from China. It is gentle and timid, and its chase is difficult and dangerous. It is about three feet in length, and in its general form resembles the deer tribe. In the male, behind the navel, and before the prepuce, there is situated an oval bag, flat on one side, and convex on the other, about three inches long, and two broad, projecting about an inch, and having a small open orifice, beset with short hairs. In the young animal it is empty, but in the adult it is filled with a secreted matter, known by the name of *Musk*. When the bag becomes too full, the animal expresses part of its contents, by rubbing itself against stones or trees. The musk expressed in this manner is said to be the purest, but none of it probably reaches this country. The best musk is brought from Tonquin, an inferior sort from Agria and Bengal, and a still worse from Russia.

Fine musk comes to us in round thin bladders, which are generally about the size of a pigeon's egg, covered with short brown hairs, lined with a thin brown membrane, well filled, and without any appearance of having been opened. The musk itself is dry, with a kind of unctuosity, of a dark reddish brown or rusty blackish colour, in small round grains, with very few hard black clots, and perfectly free from sandy, or other visible foreign matter. If chewed, and rubbed with a knife on paper, it looks smooth, bright, yellowish, and is free from grittiness. Laid on a red-hot iron, it catches flame, and burns almost entirely away, leaving only an exceedingly small quantity of light greyish ashes. The largest and fullest bag scarcely contains more than two drachms of musk.

Its taste is somewhat bitterish, and its smell extremely powerful and peculiar. Neumann got from thirty grains of musk twelve of watery and four of alcoholic extract; and inversely, ten of alcoholic, and six of watery. Its smell and taste were elevated in distillation with water, but not with alcohol. Neither the fixed nor volatile oils dissolve it.

The very great price of musk has given rise to many modes of adulterating it. To increase its weight, sand, and even particles of lead, are introduced through very small openings into the bags. The real musk is frequently abstracted from the bag, and its place supplied with dried blood, coarsely powdered, or some mixture with asphaltum. These adulterations are to be detected by discovering that the bag has been opened. The presence of blood is also known by the fetid smell it emits when heated sufficiently, and by the formation of ammonia, when rubbed with potass. Asphaltum is known by its shining fracture, and melting on hot iron, while musk is converted into charcoal. But there are even artificial bags filled with a composition containing some real musk. These are in general thicker, and covered with longer hair, and want the internal brown membrane which lines the real musk-bag.

Medical use.—Musk is still believed by some to be a medicine of very great efficacy. According to them, properly administered, it sometimes succeeds in the most desperate circumstances; it raises the pulse, without heating much; allays spasms, and operates remarkably on the brain, increasing the powers of thought, sensation, and voluntary motion.

It may be employed in the last stage of typhus fever, especially when attended with delirium, or spasmodic affection of any particular organ, or of the whole system, or subsultus tendinum, &c. It is also used with benefit in exanthematous and phlegmonic diseases, accompanied with typhoid fever; and in many spasmodic affections, as chincough, epilepsy, trismus, &c.

It is most conveniently given in substance in powder, in doses of three grains or upwards, repeated every one or two hours. Its best preparation is the tincture.

MYRISTICA MOSCHATA. *Ed. Lond.*
MYRISTICA OFFICINALIS. *Dub.*
Willd. *g.* 1351, *sp.* 1. *Monœcia Monandria.*—Nat. ord. *Oleraceæ*, Linn., *Myristiceæ*, Juss.

The nutmeg tree.

Off.—Nutmeg; oil of nutmeg; oil of mace.

a) NUCLEUS MYRISTICÆ MOSCHATÆ. *Ed.*
NUCLEI MYRISTICÆ. *Lond.*
NUX MOSCHATA. *Dub.*
b) INVOLUCRUM NUCLEI MYRISTICÆ MOSCHATÆ, *vulgo* MACIS. *Ed.*
MACIS, Nucis moschatæ involucrum. *Dub.*
c) OLEUM ESSENTIALE NUCIS MOSCHATÆ. *Dub.*
d) OLEUM EXPRESSUM NUCIS MOSCHATÆ. *Dub.*
OLEUM EXPRESSUM NUCLEORUM MYRISTICÆ. *Lond.*

THE tree which furnishes this elegant spice is a native of the Molucca islands, and is cultivated in Banda, from which all Europe has been hitherto supplied with mace and nutmeg. The entire fruit, or drupes, is about the size of a peach, and is marked with a longitudinal furrow. The external covering is smooth, fleshy and bitter. As the fruit ripens, this bursts, and discloses the mace, which is the arillus, appearing as a soft membrane, divided into narrow branched slips, very unctuous, of a dark red colour, and aromatic flavour. Within the mace is inclosed the nut, which consists of a brown, thin, hard shell, and a fatty parenchymatous kernel, of an oval shape. The fruit is gathered three times a-year. The external covering is separated on the spot, and the mace and nut carried home, where they are carefully dried in the sun. After they are dried, the nutmegs are dipt in lime water, and the mace is sprinkled with salt water, probably to preserve them from the attacks of insects.

Mace, by drying, acquires a reddish-yellow colour. When good, it is flexible, thin, oily, of a deep colour, has a strong agreeable smell, and an aromatic, bitterish acrid taste. When brittle, divided into fewer slips, of a whitish, or a pale yellow colour, and of little smell or taste, it is to be rejected.

Neumann got from 7680 parts of mace 300 of volatile oil heavier than water, on which its flavour depends. Mace also yields an expressed oil less consistent than that of nutmegs.

Nutmegs are oval, flattened at both ends, of a grey-brown colour, and reticularly furrowed on the outside, of a yellow colour within, variegated with brown undulating lines, solid, hard, unctuous to the feel, and easily cut with a knife, and have a balsamic smell, and agreeable aromatic taste. The small round nutmegs are better than the large oval ones; and they should have a strong smell and taste, and should neither be worm-eaten, musty, nor variegated with black lines. Their activity is, however, confined to the dark-coloured veins, which are not apt to be worm-eaten.

Volatile oil of nutmeg.—By distillation nutmegs yield a considerable quantity of essential oil, of a whitish yellow colour, lighter than water, and possessing the aromatic taste and smell in an eminent degree. In doses of a few drops, it is a powerful carminative and stomachic.

Expressed oil of mace. Nutmegs also yield by expression a considerable quantity of limpid yellow oil, which, on cooling, acquires a sebaceous consistence. They are first beaten to a soft paste in a warm mortar, then inclosed in a linen bag, exposed to the vapour of hot water, and squeezed in a press, of which the plates have been heated.

It is a mixture of the volatile oil on which the flavour depends, and of a fixed oil, of a white colour, without taste or smell; and as the properties which characterize it depend on the presence of the volatile oil, the denomination of Fixed oil is less correct than that of Expressed oil, given from the manner of its preparation.

In the shops we meet with three sorts of unctuous substances called Oil of mace, though really expressed from the nutmeg. The best is brought direct from the East Indies, in stone jars; this is of a thick consistence, of the colour of mace, and of an agreeable fragrant smell. The second sort, which is paler coloured, and much inferior in quality, comes from Holland, in solid masses, generally flat, and of a square figure. The third, which is the worst of all, and usually called Common oil of mace, is an artificial composition of suet, palm oil, and the like, flavoured with a little genuine oil of nutmeg. 7680 of the second sort yielded to Neumann 330 volatile oil heavier than water, 2880 of fluid expressed oil, and 4560 of solid but fusible sebaceous matter, perfectly insipid, inodorous, and of a chalky whiteness.

Med. use.—Both mace and nutmegs are rather to be considered as aromatic spices, than as articles of medicine. From the essential oil they contain, they are heating and stimulating; and they are added to other medicines for the sake of their agreeable flavour.

MYROXYLON PERUIFERUM. *Ed. Lond. Dub.*
Willd. *g.* 829, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Leguminosæ,* sect. *Papilionaceæ,* Juss.

Sweet-smelling balsam tree.

Off.—The balsam called Peruvian balsam.

BALSAMUM MYROXYLI PERUIFERI. *Ed.*
BALSAMUM PERUVIANUM. *Lond. Dub.*

THIS tree grows in the warmest provinces of South America, and is remarkable for its elegant appearance. Every part of it abounds with resinous juice; even the leaves are full of transparent resinous points, like those of the orange tree.

The balsam, as brought to us, is commonly of the consistence of thin honey, of a reddish brown colour, inclining to black, an agreeable aromatic smell, and a very hot biting taste.

It is said to be obtained by boiling the cuttings of the twigs in water, and skimming off with a spoon the balsam, which swims on the top.

By incision this tree yields a much more fragrant white or colourless balsam, which, when inspissated by the heat of the sun, forms the red or dry balsam of Peru; but it is very rarely used in Britain, and almost never to be met with in our shops.

Peruvian balsam consists of a volatile oil, resin, and benzoic acid; it is, accordingly, entirely soluble in alcohol, and in essential oils. Water dissolves part of the benzoic acid, and fixed oil combines with the resin. It may be suspended in water by trituration with mucilage and yolk of egg.

Medical use.—Balsam of Peru is a very warm aromatic medicine, considerably hotter and more acrid than copaiva. Its effects are stimulating and tonic. Hence its use in some kinds of asthmas, gonorrhœas, dysenteries, suppressions of the uterine discharges, and other disorders proceeding from debility. It is also employed externally for cleansing and healing wounds and ulcers, and sometimes against palsies and rheumatic pains.

MYRRHA, gummi-resina. *Dub. Ed.* Arboris nondum descriptæ gummi-resina. *Lond.*

Myrrh. The gum-resin of a non-descript tree.

THE tree which produces this gum-resin is not yet ascertained. Mr Bruce has given some reasons for supposing that it is a mimosa; but we may observe, that all the mimosas, with which we are sufficiently acquainted, furnish a pure gum, and not a gum-resin. Forskahl's opinion, that it is the product of the *Amyris Kataf*, is more probable. The best myrrh is brought from Troglodytitia, a province of Abyssinia, on the borders of the Red Sea; but what we receive comes from the East Indies, and is produced on the eastern coast of Arabia Felix.

The best myrrh is in the form of tears, of a yellow or reddish-yellow colour, becoming redder when breathed on; light, brittle, of an unctuous feel, pellucid, shining; presenting white semicircular striæ in their fracture; of a very bitter aromatic taste, and a strong, peculiar, not unpleasant odour. It is not good if whitish, dark-coloured, black, resinous, ill-smelled, or mixed with impurities, which is too commonly the case.

Neumann ascertained that water and alcohol are both of them capable of taking up the whole of the taste and smell of the myrrh, the extract made by either after the other being insipid. The alcohol distilled from the tincture elevated none of the flavour of the myrrh; but during the inspissation of the decoction a volatile oil arose, containing the whole of the flavour of the myrrh, and heavier than water, while the extract was merely bitter. From 7680 parts of myrrh, he got 6000 watery extract, 180 volatile oil, and 720 alcoholic: and inversely, 2400 alcoholic, and 4200 watery. Braconnot found that myrrh chiefly consisted of a gum, differing from all others. 1. It acquires cohesion by heat, which renders it partly insoluble in water, when the solution is evaporated. 2. It furnishes ammonia by distillation, and azote with nitric acid. 3. It precipitates lead, mercury and tin from their solutions. Myrrh also contains 2.3 parts in the 100 of a bitter, very fusible, resinous matter. The tincture made with strong alcohol is transparent, and, when poured into water, forms a yellow opaque fluid, but lets fall no precipitate; the watery solution is always yellow and opaque. Myrrh is not fusible, and is difficultly inflammable. Mr Hatchett found it soluble in alkalies.

Medical use.—Myrrh is a heating stimulating medicine. It frequently occasions a mild diaphoresis, and promotes the fluid secretions in general. Hence it proves serviceable in cachectic diseases arising from inactivity of the system, and it is supposed to act especially upon the uterine system, and to resist putrefaction.

It is exhibited,

1. In substance, in the form of powder, or made up into pills, in doses of 10 to 60 grains.

2. Dissolved in water, as in Griffith's celebrated, but unchemical, myrrh mixture.
3. Dissolved in alcohol.

MYRTUS PIMENTA. *Ed. Lond. Dub.*

Willd. *g.* 973, *sp.* 28. *Icosandria Monogynia.*—Nat. ord. *Hesperideæ*, Linn., *Myrtineæ*, Juss.

Pimento tree.

Off.—The fruit of the Pimento, commonly called Jamaica Pepper.

FRUCTUS MYRTI PIMENTÆ. *Ed.*
BACCÆ PIMENTÆ. *Lond.*
PIMENTO; (Piper Jamaicense) baccæ. *Dub.*

THIS is a native of Jamaica, and grows in all the woodlands on the north side. Soon after the trees have blossomed, the berries become fit for gathering, without being suffered to ripen, as when ripe they are moist and glutinous, and therefore difficult to cure, and when dried become black and tasteless. The berries are dried by spreading them on a terrace, exposed to the sun for about seven days, during which time they gradually lose their green colour, and become of a reddish-brown.

The smell of this spice resembles a mixture of cinnamon, cloves, and nutmegs; its taste approaches to that of a mixture of the whole three; whence it has received the name of *all-spice.*

Neumann ascertained that its flavour resides entirely in a volatile oil, heavier than water, and its pungency, in a resin or a substance soluble in alcohol, and insoluble in water, (Piperin?) From 480 parts, he got 120 watery extract, 30 volatile oil, and 20 alcoholic extract; and inversely, 66 alcoholic, and 100 watery.

Braconnot has also analysed pimento. He got from 180 parts, 1.9 of very acrid oil, 9 of amylum, 0.9 of wax combined with red colouring matter, 6 of a peculiar gum, 5 of animal matter, 6 of citrate of potass, 3.4 of phosphate of potass and loss, and 67.8 of insoluble matter.

Medical use.—Pimento is a warm aromatic stimulant, and is much used as a condiment in dressing food. As a medicine, it may be advantageously substituted for the more costly species, especially in hospital practice.

NICOTIANA TABACUM. *Ed. Lond. Dub.*

Willd. *g.* 379, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ*, Linn. Juss.

Tobacco.

Off.—The dried leaves.

FOLIA NICOTIANÆ TABACI.

FOLIA TABACI. Folia exsiccata Virginiana. *Lond.*

FOLIA NICOTIANÆ. *Dub.*

TOBACCO is an annual plant, a native of America, from whence it was brought into Europe about the year 1560. It is now sometimes cultivated, for medicinal use, in our gardens; but in general is is imported from America in large quantities. The leaves are about two feet long, of a pale green colour while fresh, and when carefully dried of a lively yellowish tint. They have a strong, disagreeable, narcotic smell, and a very acrid burning taste.

The active constituent of tobacco was supposed to be an essential oil; for, by long boiling, the decoction and extract of tobacco become almost inert; and by distillation, an oil is obtained from it, so active, that small animals are almost instantly killed, when wounded by a needle dipped in it.

Vauquelin has analysed tobacco, both in its fresh and prepared state. The expressed juice is manifestly acid, and contains a great quantity of albuminous matter, super-malate of lime, acetic acid, nitrate and muriate of potass, muriate of ammonia, a red matter soluble in alcohol and in water, which swells and becomes charred by heat, and an acrid principle, *nicotin,* on which its peculiar properties depend. The infusion of prepared tobacco is alkaline, and contains, beside the same principles, carbonate of ammonia, and muriate of lime, proceeding from the mutual decomposition of the muriate of ammonia and lime which is added to give it pungency. The nicotin is soluble in alcohol and in water, is volatile, but still may be concentrated by slowly evaporating its solution in water, and still more easily its tincture. Its volatility is also diminished by the malic acid with which it is combined. It is obtained in a state nearest to purity in the distilled water of the infusion of the dry, or of the expressed juice of the fresh plant. This water is colourless, but has the acrid smell and taste of tobacco smoke: with acetate of lead and nitrate of mercury, it forms white precipitates, soluble in acids, and with infusion of galls one soluble in alcohol and the alkalies. It seems not to be easily destructible, as it is the same in the dry and in the fresh plant, and is not destroyed by oxymuriatic acid.

Medical use.—On the living body, whether taken into the stomach in substance or solution, or into the lungs in the form of smoke, or applied to abraded surfaces, tobacco is capable of producing deleterious effects. It often proves virulently cathartic or emetic, and occasions intolerable cardialgia, anxiety and vertigo.

The system becomes easily habituated to the action of tobacco; and many people use very large quantities of it in several ways as a luxury, without experiencing any other bad effect than what arises from their being unable to relinquish it after the habit is confirmed.

As a medicine, it is exhibited in various forms:

1. In substance. When chewed, it causes an increased flow of saliva, and sometimes relieves the toothach; and reduced to powder, it proves an excellent errhine and sternutatory when snuffed up the nostrils.
2. In infusion in water or wine. Taken in such small doses as to have little effect on the stomach, it proves powerfully diuretic, and was employed by Dr Fowler, with very great success, in cases of dropsy and dysuria. An infusion of not more than 30 grains in ℥ xii of boiling water is often used as a clyster, half being given at a time, in obstinate constipation, ileus, and incarcerated hernia; and it has been recommended in all cases where it is an object to reduce the vital powers. The infusion is also applied externally for the cure of psora, tinea, and other cutaneous diseases.
3. In the form of smoke, it is injected into the anus by means of a bellows of a peculiar construction. By acting as a stimulus to the rectum, it sometimes succeeds in reviving the vital powers in some kinds of asphyxia, and in evacuating the intestines in cases of obstinate constipation.

NITRUM. *Dub.* See POTASSA.

NUX MOSCHATA. *Dub.* See MYRISTICA.

OLEA EUROPÆA. *Lond. Ed. Dub.*

Willd. *g.* 36, *sp.* 1. *Diandria Monogynia.*—Nat. ord. *Sepiariæ*, Linn., *Jasmineæ*, Juss.

The olive tree.

Off.—Olive oil. The fixed or expressed oil of the fruit.
OLEUM FIXUM OLEÆ EUROPÆÆ. Ex fructu. *Ed.*
OLEUM OLIVÆ. Druparum oleum expressum. *Lond.*
OLEUM OLIVARUM. *Dub.*

THE olive tree is a native of the south of Europe and north of Africa. It is cultivated in France, Spain, and Italy, for the sake of its fruit, and the oil expressed from it. Olives, when fresh, have a harsh, bitter, and extremely disagreeable taste, and they are eaten only when prepared. They are first steeped for several days in a ley of wood ashes, and then pickled in a strong solution of muriate of soda.

They are principally valued for the oil obtained by expression from their fleshy pericarp.

For this purpose they are gathered when fully ripe, and immediately bruised, and subjected to the press; and the finest, or *virgin oil*, is obtained by simple expression after they have been left in a heap for 10 or 12 days to soften, and begin to ferment. A less pure oil is then got by throwing upon them boiling water to dissolve the mucilage, which retains it. In some countries they allow the olives to remain in a heap till the mucilage be destroyed. More oil is thus obtained, but of an inferior quality.

Good olive oil should have a pale yellow colour, somewhat inclining to green, a bland taste, without smell, and should congeal at 38° Fahrenheit. In this country it is frequently rancid. Olive oil, like all the other unctuous substances, both vegetable and animal, is not an immediate vegetable principle, but an organic product, consisting of various principles, elain, stearin, or fluid and concrete unctuous matter, and a mucilaginous principle. The last is mechanically mixed, is always to be considered as an impurity, and is in a great degree deposited by rest; the two former are essential to the constitution of the oil, the stearin being held in solution by the elain, or crystallizing from it on reduction of temperature. In the frozen state they are easily separated by mere expression, or by means of cold alcohol, which dissolves the elain, and leaves the stearin.

Olive oil is sometimes mixed with oil of poppy seeds; but it is known by having a less tendency to congeal by reduction of temperature. M. Poutet shakes three ounces of suspected oil with two drachms of solution of nitrate of mercury together for two minutes. If the olive oil be pure it thickens immediately, and next day is a concrete mass; but if it be adulterated with poppy oil, there is only a precipitate, and the quantity of supernatant oil, which is now coloured, shews the degree of adulteration. Another method of detecting the adulteration of olive oil, in consequence of its being a much worse conductor of electricity than any other oil, has been proposed by M. Rousseau, who has contrived an apparatus for the purpose.

Medical use.—Taken internally, it operates as a gentle laxative, and is given in cases of worms. It is also given in large quantities to mitigate the action of acrid substances taken into the stomach. It is used internally in frictions, in gargles, and in clysters; but its principal employment is for the composition of ointments and plasters.

OLEUM CAJEPUT. *Dub.* See MELALEUCA.

OLIBANUM. *Dub.* See JUNIPERUS.

ONISCUS ASELLUS. *Dub.*
Insecta aptera.

Off.—Slaters, killed by the vapour of alcohol.

MILLEPEDÆ, spiritus vini vapore enecatæ.

THESE insects are found in cellars, under stones, and in cold moist places; in warm countries they are rarely met with. They have a faint disagreeable smell, and a somewhat pungent, sweet, nauseous taste.

Neumann got from 480 parts 95 watery and ten alcoholic extract; and inversely 52 alcoholic and 45 watery. Nothing rose in distillation with either.

Their medical virtues have been very much overrated.

OPIUM. *Dub.* See PAPAVER.

OPOPONACIS GUMMI RESINA. *Lond.* See PASTINACA.

ORIGANUM.

Willd. *g.* 1116, Smith, *g.* 273. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

Sp. 10. Willd. *sp.* 1. Smith. ORIGANUM VULGARE. *Lond. Dub.*

Common marjoram.

Off.—The herb.

ORIGANUM. *Lond.*
FOLIA ORIGANI. *Dub.*

THIS is a perennial plant, which is met with upon dry, chalky hills, and in gravelly soils, in several parts of Britain, and flowers in July and August. It has an agreeable smell, and a pungent taste, warmer than that of the garden marjoram, and much resembling thyme, with which it seems to agree in virtue. An essential oil distilled from it is kept in the shops, and is very acrid.

Sp. 15. Willd. ORIGANUM MAJORANA. *Ed. Dub.*
Sweet marjoram.
Off.—The plant.
HERBA ORIGANI MAJORANÆ. *Ed.*
HERBA MAJORANÆ. *Dub.*

SWEET marjoram is an annual plant, which grows wild in Portugal, but is cultivated in our gardens, principally for culinary purposes. It is a moderately warm aromatic, yielding its virtues both to aqueous and spirituous liquors by infusion, and to water in distillation.

OSSA. *Ed.*
Bones.

RECENT bones consist of about half their weight of phosphate of lime, a third of their weight of cartilage or gelatin, and one-tenth of carbonate of lime. They also contain a little fluate of lime, phosphate of magnesia, soda, and muriate of soda. M. Darcet has shewn how a great deal of nourishment can be extracted from them, by removing the earthy salts by means of muriatic acid; but in pharmacy bones are only used for the preparation of phosphate of lime, by burning them, and of phosphate of soda, and phosphate of antimony and lime, by decomposition.

OVUM. Phasianus Gallus. *Lond.*
Egg of the dunghill fowl.

THIS useful bird is probably a native of India, where it is found wild in the jungles. It is now domesticated almost every where, and furnishes one of the most wholesome and delicate articles of food.

The egg only is officinal. The shell consists principally of carbonate of lime, with a small quantity of phosphate of lime and animal matter. When burnt the animal matter and carbonic acid are destroyed, and we obtain a lime, mixed with a little phosphate of lime.

The contents of the egg consist of two substances, the white and the yolk. The white is albumen, combined with a little soda and sulphur. The yolk is also albuminous, but contains moreover a bland oil, and some colouring matter. The white is used for clarification. The yolk is sometimes used in pharmacy for suspending oily and resinous substances in water.

In the French codex there is a formula for separating the oil, which is also used in the arts, under the title of Egg-oil, and it may be easily expressed from the yolk hard boiled. This oil is soluble in all proportions in sulphuric ether, and becomes soon rancid. In pharmacy, it is said to accelerate the extinction of mercury.

OXALIS ACETOSELLA. *Lond.*

Willd. *g.* 918, *sp.* 25. Smith, *g.* 217, *sp.* 1. *Decandria Pentagynia.*—Nat. ord. *Gruinales,* Linn., *Oxalideæ,* Juss.

Common wood-sorrel.

Off.—The leaves.

ACETOSELLA. *Lond.*

THIS is a small perennial plant, which grows wild in woods, and under hedges, and flowers in April and May. The leaves contain a considerable quantity of superoxalate of potass, and have an extremely pleasant acid taste. They possess the same powers with the vegetable acids in general, and may be given in infusion, or beaten with sugar into a conserve, or boiled with milk, to form an acid whey. The super-oxalate of potass is extracted in large quantities from them, and sold under the name of *Essential Salt of Lemons.*

Twenty pounds of the fresh leaves yielded to Neumann six pounds of juice, from which he got two ounces two drachms and a scruple of salt, besides two ounces and six drachms of an impure saline mass.

PAPAVER.

Willd. *g.* 1015, *sp.* 4. Smith, *g.* 243. *Polyandria Monogynia.*—Nat. ord. *Rhœades,* Linn., *Papaveraceæ,* Juss.

Sp. 5. Willd. *sp.* 4. Smith. PAPAVER RHŒAS. *Lond. Dub.*

Corn-rose, or red poppy.

Off.—The flower.

PETALA RHŒADOS. *Lond.*

PETALA PAPAVERIS ERRATICI. *Dub.*

THIS species of poppy is annual, and very common in our corn fields. It flowers in June and July, and the petals give out a fine red colour when infused, and are supposed to possess slightly anodyne powers.

Sp. 7. Willd. *sp.* 8. Smith. PAPAVER SOMNIFERUM. *Ed. Lond. Dub.*

White Poppy.

Off.—Poppy heads.

a) CAPSULÆ PAVAVERIS SOMNIFERI. *Ed.*
CAPSULÆ PAPAVERIS ALBI. *Dub.*
CAPSULÆ PAPAVERIS, capsulæ maturæ. *Lond.*
b) OPIUM, Succus concretus papaveris somniferi. *Ed.*
OPIUM, capsularum immaturarum succus concretus (Turcicus.) *Lond.*
OPIUM, Succus concretus. *Dub.*

THE white poppy is also an annual, and is sometimes found wild in this country, but it is originally a native of the warmer parts of Asia. It flowers in July, and is frequently cultivated for the beauty and the variety of its flowers, and for its seeds. Many attempts have been made in this country to obtain opium from its capsules; and Mr Ball received a premium from the Society for encouraging the arts, for specimens of British opium, in no respect inferior to the best eastern opium. Mr Young, a respectable surgeon of this city, has also obtained it of excellent quality and in considerable quantity. But we apprehend that the climate of this country, besides the destruction by insects, is an insuperable obstacle to its becoming a profitable branch of horticulture.

The leaves, stalks, and capsules of the poppy, abound with a narcotic milky juice, which is partially extracted, together with a considerable quantity of mucilage, by decoction. The liquor, strongly pressed out, suffered to settle, clarified with whites of eggs, and evaporated to a due consistence, yields about one-fifth, or one-sixth of the weight of the heads, of extract, which possesses the virtues of opium in a very inferior degree, and does not come to this country, unless when used to adulterate the genuine opium.

A strong decoction of the dried heads, mixed with as much sugar as is sufficient to reduce it to the consistence of a syrup, becomes fit for keeping in a liquid form, and is the only officinal preparation of the poppy. It is, however, a very unequal preparation, as the real quantity of opium it contains is very uncertain; and as a medicine, it is by no means equal to syrup, to which a certain quantity of solution of opium is added.

The seeds of the poppy are simply emulsive, and contain none of the narcotic principle. They yield a considerable quantity of fixed oil by expression. The seeds occur of two varieties, white and black.

Off.—Turkey opium; the concrete juice of the capsules before they are ripe.

OPIUM. *Ed. Lond. Dub.*

Opium is the inspissated juice of the poppy. In the evening several superficial longitudinal incisions are made in the capsules, when they are almost ripe, with a knife having from three to five blades. The juice which exudes during the night is collected next day after it has been thickened, by the heat of the sun, by means of iron scrapers, and put into an earthen pot. The operation is repeated as long as the heads furnish juice in sufficient quantity, and the opium is worked into masses with a wooden spatula, in the heat of the sun, until it acquires the due degree of thickness, when the masses are covered with poppy or tobacco leaves.

Two kinds of opium are found in commerce, distinguished by the names of Turkey and East-India opium.

Turkey opium is a solid, compact, perfectly opaque substance, of moderate specific gravity, possessing a considerable degree of tenacity, yet somewhat brittle if half cut through; the section dense and a little shining; the fracture earthy, and both nearly uniform in appearance; compact; of a dark-brown colour; becoming softer by the heat of the fingers, difficultly reduced to powder, unless in the cold, after having been long dried in small pieces. Powder of a light brown, and readily plastic when baked together; when moistened, marking on paper a light-brown interrupted streak, scarcely colouring the saliva when chewed, at least only tinging it of a greenish colour, and rendering it frothy, exciting at first a nauseous bitter taste, which soon becomes acrid, with some degree of warmth, and having a peculiar heavy disagreeable smell. The best kind is in flat pieces; and besides the large leaves in which they are enveloped, they are covered with the reddish capsules of a species of rumex used in packing it. The round masses, which have none of the capsules adhering to them, are evidently inferior in quality. Opium is bad if it be soft or friable, mixed with any impurities, have an intensely dark or blackish colour, a weak or empyreumatic smell, a sweetish taste, or draw upon paper a brown continuous streak.

East-Indian opium has much less consistence, being sometimes not much thicker than tar, and always ductile. Its colour is much darker; its taste more nauseous, and less bitter; and its smell rather empyreumatic. When imported it is considerably cheaper than Turkish opium, and is supposed to be of only half the strength. One-eighth of the weight of the cakes is allowed for the enormous quantity of leaves with which they are enveloped. In the East Indies, when opium is not good enough to bring a certain price, it is destroyed under the inspection of public officers. No opium of this kind is now brought to Europe.

Opium is not fusible, but is softened even by the heat of the fingers. It is highly inflammable. It is partially soluble, both in alcohol and in water. Neumann got from 1920 parts of opium, 1520 alcoholic, and afterwards 80 watery extract, 320 remaining undissolved: and inversely 1280 watery, and 200 alcoholic extract, the residuum being 440.

The solutions of opium are transparent, and have a brown or vinous colour. The watery solution is not decomposed by alcohol. A small quantity of matter, which, as far as my experiments go, is neither fusible nor remarkably inflammable, is separated from the alcoholic solution by water. I have also observed that the watery solution of opium, and the alcoholic, after it has been precipitated by water, does not redden vegetable blues, is not precipitated by acids or caustic alkalies, but is precipitated copiously by carbonate of potass, muriate and super-nitrate of mercury, oxymuriate of tin, sulphate of copper, sulphate of zinc, acetate of lead, nitrate of silver, and red sulphate of iron. The precipitate in the last case was of a dirty brown colour, not resembling those by alkaline or astringent substances. The solutions of opium, especially the watery, are also copiously precipitated by infusion of galls.

The narcotic virtues of opium are imparted by distillation to alcohol and to water, and they are diminished, or entirely dissipated, by long boiling, roasting, or great age. The part of opium which is not soluble either in water or in alcohol is chiefly caoutchouc.

Neumann, Haller, and Tralles had all obtained crystals from opium, and Derosnes and Pagenstecher pointed out the method of procuring them in greater quantity.

By evaporating a watery solution of opium, to the consistence of a syrup, Derosnes obtained a precipitate, which was increased by diluting the extract with a little cold water. He dissolved this in hot alcohol, from which it again separated on cooling. When purified by repeated solutions, it crystallized in rectangular prisms, with rhomboidal bases. It was solid, white, had no taste or smell, was insoluble in cold water, and soluble in 400 parts of boiling water, did not affect vegetable blues, was soluble in 24 parts of boiling alcohol, and 110 cold; soluble in hot ether and volatile oils, and separated from them as they cooled; soluble slowly in oil of olives and oil of almonds below the boiling temperature; soluble in boiling, but not in cold acetic acid, and with nitric acid forming a yellow solution without heat. Exposed to heat it melts, becomes transparent, and remains so after cooling. When burnt it gives out a thick smoke and ammoniacal odour. It was supposed by Sertuerner to be a meconate of morphia, but Robiquet considers it as a peculiar principle, which he has called *Narcotin,* and has shewn that it may be obtained almost pure by acting upon the soft watery extract of opium, by ether, which dissolves scarcely any thing but the *narcotin.*

M. Sertuerner, apothecary in Eimbeck in Hanover, published his first observations and discoveries regarding the nature of the narcotic principles of opium in 1803, but they attracted little notice. He again published a fuller memoir in Gilbert's Annals, in January 1817, which was immediately translated into the French Annals, and his observations were generally confirmed by Gay-Lussac and Robiquet, and prosecuted still farther by Choulant at Dresden. Sertuerner infused four ounces of powder of opium in repeated portions of cold distilled water, and filtered the solution through cloth. It was evaporated in a glass vessel, with a gentle heat, to eight ounces; which, after standing eight days, deposited six grains of sulphate of potass. The remaining fluid was diluted with distilled water, and yielded a flocculent precipitate on the addition of caustic ammonia, which, after being washed successively with sulphuric ether, caustic ammonia, and alcohol, yielded three drachms of a fine brownish white powder, to which M. Sertuerner gave the name of *Morphium,* now *Morphia,* and which may be farther purified by solution in boiling alcohol and crystallization. It seemed to be perfectly free from ammonia, yet it possessed all the characteristic properties of an alkali, colouring rhubarb brown, and fernambuc violet, and forming neutral salts with acids. It has a peculiar bitter astringent taste, and its solutions leave a red stain on the skin. Its crystals are very obtuse, single or double pyramids, with a square or long rectangular base, or orisms with a trapezoid base. It dissolves in 82 parts of boiling water, from which it crystallizes on cooling; in 36 of boiling and 42 of cold alcohol, and in 8 of sulphuric ether.

The fluid from which the morphia was precipitated, after being heated to 120 F. to expel the ammonia, was filtered, and a solution of muriate of barytes (or of acetate of lead) added as long as there was any precipitate. The white precipitate, when washed and dried, weighed 7 drachms, and consisted of the barytes mixed with a new acid, to which M. Sertuerner has given the name of *meconic*, and which he separated by sulphuric acid. This mode of obtaining it has not succeeded with others, and its existence was doubted; but M. Choulant, by mixing the meconate of barytes with an equal weight of vitreous boracic acid, and subliming, obtained the meconic acid, in the form of shining scales, of a fine white salt. Its taste is at first sour and cooling, but afterwards unpleasantly bitter. It reddens vegetable blues, and combines with alkalies and earths, and gives a cherry red colour to solutions of iron: its crystals are quadrangular tables, and it is soluble in twice its weight of water, and also in alcohol and ether.

Robiquet has altered and improved Sertuerner's process for obtaining morphia, by boiling the watery solution of opium with pure magnesia, and then extracting the morphia from the precipitate by alcohol. So far as it has been analyzed, the essential constituents of opium seem to be, 1. morphia; 2. narcotin; 3. meconic acid; 4. an unnamed acid; 5. a substance like caoutchouc; 6. one like fibrin; 7. a resin; 8. gum; 9. amylum; 10. fixed oil; 11. lignin.

Medical use.—The action of opium on the living system has been the subject of the keenest controversy. Some have asserted that it is a direct sedative, and that it produces no stimulant effects whatever; while others have asserted as strongly, that it is a powerful and highly diffusible stimulus, and that the sedative effects, which it undeniably produces, are merely the consequence of the previous excitement. The truth appears to be, that opium is capable of producing a certain degree of excitement, while the sedative effects which always succeed are incomparably greater than could be produced by the preceding excitement. The stimulant effects are most apparent from small doses. These increase the energy of the mind, the frequency of the pulse, and the heat of the body, excite thirst, render the mouth dry and parched, and diminish all the secretions and excretions, except the cuticular discharge, which they increase. These effects are succeeded by languor and lassitude. In larger doses, the stimulant effects are not so apparent; but the excitability is remarkably diminished, and confusion of head, vertigo, and sleep are produced. In excessive doses it proves a violent narcotic poison, exciting headach, vertigo, delirium, and convulsions, accompanied with a very slow pulse, stertorous breathing, and a remarkable degree of insensibility or stupor, terminated by apoplectic death. In one case, where I inspected the body after death, the inner membrane of the stomach was remarkably corrugated, and with some inflammation; but as large doses of sulphate of zinc and flour of mustard had been also taken, no inference can be drawn from these appearances. The bad effects of an over-dose of opium are often prevented by the occurrence of vomiting, or by pumping or sucking it out of the stomach by Mr Bryce's syphon. A solution of an alkaline carbonate should also be injected to decompose the opium and render the morphia insoluble. Its effects are best counteracted by the exhibition of repeated doses of diffusible stimuli, and chiefly by not permitting him to yield to his desire of sleeping. By habit, the effects of opium on the body are remarkably diminished. There have been instances of four grains proving fatal to adults, while others have been known to consume as many drachms daily. The habitual use of opium produces the same effects with habitual dram-drinking; tremors, paralysis, stupidity, and general emaciation; and like it can scarcely ever be relinquished.

MM. Orfila and Magendie have each made experiments to ascertain the effects of the various principles contained in the opium, but these physiologists do not agree in their results. Pure crystallized morphia has little or no effect, on account of its little solubility in the juices of the stomach; but all its solutions in acids, oil, and alcohol, excite the same narcotic effects as the opium itself, and in a smaller dose. Magendie considers the narcotin as the exciting principle of opium; but this is denied by Orfila, who asserts that it produces nausea, vomiting, debility, accelerated circulation and death without the vertigo or affection of the senses, palsy of the extremities, plaintive cries, or convulsions, which arise from morphia.

In disease, opium is chiefly employed to mitigate pain, diminish morbid sensibility, procure sleep, allay inordinate actions, and to check diarrhœa, and other excessive discharges. It is contraindicated in gastric affections, plethora, a highly inflammatory state of the body, and determination of the blood to particular viscera.

In intermittents, it is said to have been used with good effect in every stage.

In fevers of the typhoid type, accompanied with watchfulness or diarrhœa, it is extremely useful; but when not indicated by particular symptoms, it does harm, by augmenting thirst, and producing constipation.

Especially when combined with calomel, it has lately been much employed in inflammations from local causes, such as wounds, fractures, burns, absorption of morbid poisons, as in swelled testicles, &c. and even in active inflammations, accompanied with watchfulness, pain, and spasm, after bloodletting.

In small pox, when the convulsions before eruption are frequent and considerable, or when the accompanying fever is of the typhoid type, opium is liberally used. It is likewise given from the fifth day onwards; and is found to allay the pain of suppuration, to promote the ptyalism, and to be otherwise useful.

In dysentery, after the use of gentle laxatives, or along with them, opium, independently of any effect it may have on the fever, is of consequence in allaying the tormina and tenesmus, and in obviating that laxity of bowels which so frequently remains after that disease.

In diarrhœa, the disease itself generally carries off any offending acrimony, and then, or after purgatives, opium is used with great effect. Even in the worst symptomatic cases, it seldom fails to alleviate.

In cholera and pyrosis, it is the best remedy.

In colic, it is employed with laxatives; and often prevents ileus and inflammation, by relieving the spasm. Even in ileus it is sometimes used to allay the vomiting, the spasms, and the pain.

It is given to allay the pain, and favour the descent of calculi, and to give relief in jaundice and dysuria proceeding from spasm.

It is of acknowledged use in the different species of tetanus; affords relief to the various spasmodic symptoms of dyspepsia, hysteria, hypochondriasis, asthma, rabies canina, &c. and has been found useful in some kinds of epilepsy.

In syphilis it is useful in combating symptoms, and in counteracting the effects resulting from the improper use of mercury.

It is found useful in certain cases of threatened abortion and lingering delivery, in convulsions during parturition, and in the after-pains and excessive flooding.

The administration of opium to the unaccustomed, is sometimes very difficult. The requisite quantity is wonderfully different in different persons, and in different states of the same person. A quarter of a grain will in one adult produce effects which ten times the quantity will not do in another; and a dose that might prove fatal in cholera or colic would not be perceptible in many cases of tetanus or mania. When given in too small a dose, it is apt to produce disturbed sleep, and other disagreeable consequences; but sometimes a small dose has the desired effect, while a larger one gives rise to vertigo and delirium, and with some constitutions it does not agree in any dose or form. Its stimulant effects are most certainly produced by the repetition of small doses, its anodyne by the giving of a full dose at once. In some it seems not to have its proper effect till after a considerable time. The operation of a moderate dose is supposed to last in general about eight hours from the time of taking it.

Externally, opium is used to diminish pain and to remove spasmodic affections. It is found particularly serviceable in chronic ophthalmia, when accompanied with morbidly increased sensibility.

Opium may be exhibited,

1. In substance, made up in the form of a pill, lozenge, or electuary. Its most efficient form.
2. Dissolved in diluted alcohol, or white wine.
3. Dissolved in water, or watery fluids. Very perishable.
4. Dried and reduced to powder.
5. In various chemical preparations.

It is often given in combination with aromatics, astringents, emetics, bitters, camphor, soap, distilled waters, mucilage, syrups, acids, carbonate of ammonia, ether, acetate of lead, tartrate of antimony and potass, and unctuous substances. Some of these are certainly unchemical mixtures; for I find by experiment that the solutions of opium are copiously precipitated by astringents, the alkaline carbonates, and all the metallic salts.

PASTINACA OPOPONAX. *Lond.*

Willd. *g.* 558, *sp.* 3. *Pentandria Digynia.*—Nat. ord. *Umbellatæ*, Linn. Juss.

Opoponax.

Off.—A gum-resin.

GUMMI RESINA OPOPONACIS. *Lond.*

THIS plant is perennial, and indigenous in the south of Europe; but the gum-resin, which is said to be obtained by wounding the stalk or root, is brought from the Levant and East Indies, sometimes in round drops or tears, but more commonly in irregular lumps, of a reddish yellow colour on the outside, with specks of white, inwardly of a paler colour, and frequently variegated with large white pieces. It has a peculiar strong smell, and a bitter, acrid, somewhat nauseous taste.

Neumann got from 480 parts, 166 alcoholic, and afterwards 180 watery extract; and inversely, 226 watery, and 60 alcoholic. Both the water and alcohol distilled from it were impregnated with its flavour. It forms a milky solution with water, and yields a little essential oil on distillation. It is supposed to be an emmenagogue, but is rarely used.

Petroleum. *Lond. Dub.* See Bitumen.

Pimentæ baccæ. *Lond. Dub.* See Myrtus.

Pimpinella anisum. *Ed. Lond. Dub.*

Willd. *g.* 562, *sp.* 8. *Pentandria Digynia.*—Nat. ord. *Umbellatæ,* Linn. Juss.

Anise.

Off.—The seeds.

Semina pimpinellæ anisi. *Ed.*

Anisi semina. *Dub. Lond.*

Anise is an annual umbelliferous plant, growing wild in Crete, Syria, and other places of the East. It is cultivated in some parts of France, Germany, and Spain, and may be raised also in England; the seeds brought from Spain, which are smaller than the others, are preferred.

Aniseeds have an aromatic smell, and a pleasant warm taste, accompanied with a degree of sweetness. Water extracts very little of their flavour; rectified spirit the whole.

Pinus.

Willd. *g.* 1711, Smith, *g.* 408. *Monœcia Monadelphia.*—Nat. ord. *Coniferæ,* Linn. Juss.

Resina pini. Ex variis pinis.
  1. Liquida, vulgo
    a) Terebinthina veneta.
    b) Terebinthina vulgaris.
  2. Solida.
    a) Sponte concreta, vulgo Pix burgundica.
    b) Oleo volatile privata, vulgo Resina alba.
  3. Empyreumatica, vulgo Pix liquida.
Oleum volatile pini.

Ed.

Sp. 1. Smith, Willd. PINUS SYLVESTRIS. *Ed. Lond. Dub.*
Scotch fir.

Off.—Common Turpentine. Oil of Turpentine. Rosin. Tar. Black pitch.

a) TEREBINTHINA VULGARIS, resina liquida. *Lond.*
  TEREBINTHINA VULGARIS, resina. *Dub.*
b) OLEUM TEREBINTHINÆ; oleum e Terebinthina distillatum. *Lond.*
c) RESINA FLAVA; residuum postquam Oleum Terebinthinæ distillatum est. *Lond.*
  RESINA ALBA. *Dub.*
d) PIX LIQUIDA. *Dub.*
  PIX LIQUIDA; resina præparata liquida. *Lond.*
e) PIX NIGRA; resina præparata solida. *Lond.*

Sp. 7. Willd. PINUS LARIX. *Ed. Dub.*
The larch.

Off.—Venice Turpentine; Oil of Turpentine.

TEREBINTHINA VENETA; resina. *Dub.*

Sp. 27. Willd. PINUS BALSAMEA. *Ed. Lond. Dub.*
The Hemlock fir.

Off.—Balsam of Canada; Canadian Turpentine.

RESINA PINI BALSAMEÆ; resina liquida. *Ed.*
TEREBINTHINA CANADENSIS; resina liquida. *Lond.*
BALSAMUM CANADENSE. *Dub.*

Sp. 32. Willd. PINUS ABIES. *Ed. Lond. Dub.*
The Spruce fir.

Off.—Common Frankincense. Burgundy Pitch.

a) ABIETIS RESINA; resina concreta. *Lond.*
  PIX ABIETINA; resina præparata. *Lond.*
  PIX BURGUNDICA. *Dub.*

THESE different species of fir are all natives of sandy situations. The first only is a native of this country. The Abies grows in the north of Europe; the Larix in the alpine regions of the south; and the Balsamea in Canada.

The following conspectus of this tribe, by MM. Moringlane, Duponchel, and Bonastre, in answer to a prize question by the Pharmaceutic Society of Paris, may be useful.

SECTION I.—*Pines.*

Pinus maritima—Sea pine—Pine of Landes—Sea-coasts of the south of Europe. Product: Turpentine of Bourdeaux; contains much volatile oil; employed much in the navy and in the arts; little esteemed in pharmacy.

Pinus sylvestris—Scotch fir—North of Europe. Product: Tenacious thick resin, containing little oil; yields excellent tar, pitch, and *brais gras* for the navy.

Pinus rigida—Rigid pine—Coast of Canada, very cold climate. Product: Resinous juice, said to be black; resin like the preceding.

Pinus australis or *palustris*—Missisippi pine—Sea-coast of Carolina and Florida. Product: Boston turpentine; yields one-sixth of good oil; false elemi, resin for making soap, and the best tar for cordage.

Pinus strobus — Weymouth pine — Virginia. Product: American turpentine; more fluid than the others, and yields more oil; is mixed with Boston turpentine.

Pinus cembra — Siberian stone pine — European Alps. Product: A very fluid turpentine; its branches macerated in water, and distilled, yield the Carpathian balsam.

SECTION II.—*Firs.*

Abies taxifolia—Silver fir — European Alps. Product: Strasburgh turpentine; yields two resins, the one, deposited in blisters, remains clear and fragrant; the other, furnished by incision, gets turbid, and resembles pitch.

Abies balsamea—Balm of Gilead—North America. Product: Spurious balsam of gilead; deposited in blisters, preserves its limpidity, smell and strength. Balsam of Canada obtained by incision is less fragrant, less clear, and thicker.

False Firs.

Abies picea—North of Europe and Asia. Product: White pitch; a thick resin, at first clear, then turbid and soon hardens; very little oil.

Abies Canadensis—Hemlock spruce — North America. Product, considered resinous, of which is made the North American pitch, which is tar boiled down to one half.

Abies nigra—Black spruce—North of America. Product: Black essence; constitutes more than two-thirds of the tar of Ohio, Lake Champlain, as far as Newfoundland.

Abies orientalis—Levant spruce. Product: Spruce tears; resin exuding naturally from the extremities of the branches, remains clear.

Larches.

Larix Europæa—Common larch—European Alps. Product: Venice and Briançon turpentine; occurs rather towards the centre of the tree, and sometimes in small reservoirs; the most employed in pharmacy; yields also Briançon manna; and also manna of Oremburgh, according to Pallas.

Larix cedrus—Cedar of Lebanon—Syria, Caucasus. Product: Cedar resin; yields also a saccharine substance, the cedar honey of the ancients, analogous to Briançon manna; young seeds filled with a resinous acrid juice.

Pinus dammara—Oval-leaved larch—Mountains of Amboyna. Product: White dammar; its oil evaporates very quickly, and there results a resin as hard as stone.

Dombeya excelsa — Aracauria imbricata—Norfolk island pine. Product: Glutinous turpentine, of a milky whiteness; the body of the tree, according to some, contains none.

Thuya articulata.—North of Africa. Product: Sandarac, a dry resin; flows by incision, or, according to Desfontaines, naturally.

All the tribe abound in every part with resinous juice, which possesses the same general qualities, but presents some varieties, according to the nature of the species and mode of preparation.

We may arrange the products,

1. Into those which exude spontaneously;
2. Into those procured by wounding the tree;
3. Into those procured by decoction; and,
4. Into those which are procured by the action of fire.

By exudation.

The *pinus larix* exudes a species of manna, called Briançon or Oremburgh manna, which is not used; as, besides the saccharine matter, it evidently contains turpentine.

From the *pinus abies*, and also from the *pinus sylvestris*, in warm seasons and climates, a resinous juice exudes spontaneously, which hardens into tears by exposure to the air. It is the common frankincense, or *Thus* of the former editions of the London Pharmacopœia, but no longer officinal. It is a solid brittle resin, brought to us in tears, or masses, of a brownish or yellowish colour on the outside; internally whitish, or variegated with whitish specks, of a bitterish, acrid, not agreeable taste, with little smell.

Real burgundy pitch is collected, according to Tingry, from the *Pinus picea*, or spruce fir-tree. The resinous juice which exudes from this species is less fluid and less transparent than the proper turpentines. It is collected by the peasants, strained through cloths, and put into barrels. If its consistence be too thick, it is mixed over the fire with a little turpentine and oil of turpentine.

By incision.

To obtain the products of the second kind, a series of wounds is made through the bark into the wood, beginning at the bottom, and rising gradually upwards, until a stripe of the bark, about nine feet high, be removed, which is commonly effected in about four years. The same operation is repeated on the opposite side. The operation is then recommenced close to the edge of the former wound, which by this time is nearly closed. A tree worked in this manner will survive, and furnish turpentine for near a century. The juice, or turpentine, which flows from these wounds, during summer, is collected in a small cavity formed in the earth, at the bottom of the incisions, from which it is occasionally removed into proper reservoirs previous to its purification.

As the trees exude very little juice during cold weather, no new incisions are made in winter; but the old ones get covered with a soft resinous crust (called *barras*, when it is impure and mixed with bits of bark, dust, and sand; *gallipot*, when collected with more care; or *white incense*, when it is allowed to remain so long exposed that it becomes resinified,) which is scraped off, and also collected for subsequent purification All these products are purified by liquefaction and filtration They consist almost entirely of essential oil and a resin, and differ only in the proportions, the turpentine containing the largest proportion of oil, and the gallipot of resin. Although gallipot contains volatile oil, the quantity is so small, that it is never subjected to distillation, but is purified by melting it with a very gentle fire, and filtrating it. By this process it still contains volatile oil, and is often sold by the name of Burgundy pitch. If boiling water be added to it after it is strained, but while it is still fluid, and they be agitated together till the mass cools, we have a yellow resin, which, from still containing some essential oil, is preferred to that prepared by a similar process from the residuum of the distillation of turpentine. A mere mixture of gallipot and barras, made without heat, is often sold under the name of Burgundy pitch; but the mass resulting from this combination soon becomes friable. It has not the unctuosity, viscidity, tenacity, and smell which distinguish the real kind.

Turpentines.

Turpentines, or fluid resinous juices obtained by incision, have different appellations, chiefly according to the country from which they are procured.

Balsam of Canada, from the *Pinus balsamea* and *Pinus Canadensis.*
RESINA PINI BALSAMEÆ. *Ed.*
TEREBINTHINA CANADENSIS. *Lond.*
BALSAMUM CANADENSE. *Dub.*
Cyprian turpentine, from the *Pistacia terebinthus.*
TEREBINTHINA CHIA. *Lond.*
Strasburgh turpentine, from the *Pinus picea.*
Venice turpentine, from the *Pinus larix.*
TEREBINTHINA VENETA. *Ed. Dub.*
Common turpentine, from the *Pinus sylvestris.*
TEREBINTHINA VULGARIS. *Lond. Dub. Ed.*
Hungarian balsam, from the *Pinus sylvestris,* var. *Mughos.*
Carpatian balsam, from the *Pinus cembra.*

None of these are properly balsams; which term is now confined by chemists to those resinous substances which contain benzoic acid. The London College have done well in retaining Turpentine as a proper generic name for these oleo-resinous juices.

All these species of turpentine possess the same general properties. They are more or less fluid, with different degrees of transparency; of a whitish or yellowish colour; a penetrating smell, and a warm, pungent, bitterish taste. They are entirely soluble in alcohol, combine with fixed oil, and impart their flavour to water, but are not soluble in it. They are decomposed by a moderate heat, being separated into an essential oil and a resin, and are exceedingly inflammable, burning with a large white flame, and much smoke.

Each species has some peculiarities. The Canadian is reckoned the best, and next to it the Chian. They are more transparent, and have a more agreeable flavour than the other kinds. The common turpentine, as being the most offensive, is rarely given internally; its principal use is in plasters and ointments among farriers, and for the distillation of the essential oil.

By distillation turpentines are analysed into two products, a volatile oil and a solid resin.

Oil of Turpentine is officinal in the Edinburgh and London Pharmacopœias; by the Dublin College directions are given for its preparation.

Oil of turpentine is lighter than water, transparent, limpid, and volatile. It has a hot pungent taste, and a penetrating smell; is highly inflammable, and possesses all the other properties of essential oils.

It is sparingly soluble in rectified spirit, although turpentine itself dissolves easily, apparently taken up by seven of alcohol. Boiling spirit dissolves it more abundantly; but on standing, the greatest part of the oil falls to the bottom. I find that one part of alcohol 0.803 dissolves five of oil of turpentine 0.865.

Resins.

The residuum of the distillation gets different names, according to some peculiarities in its treatment. When the distillation is performed without addition, and continued until the whole essential oil be driven off, and there appear some traces of empyreuma, the residuum is Fiddlers rosin, or Colophony; but if, while the mass is still fluid, a quantity of water be added, and thoroughly blended with the resin by long and constant agitation, it is then called Yellow rosin.

The under part of the cake of the residuum of the distillation resembles fiddlers rosin, the action of the fire having entirely expelled the water and volatile oil, and rendered it slightly empyreumatic and transparent, while the upper part, from retaining some water, is opaque and yellow.

By decoction.

A fluid extract, prepared by decoction from the twigs of the *pinus sylvestris,* is the well-known Essence of spruce, which, fermented with molasses, or sugar and water, forms the fashionable and wholesome beverage of spruce beer.

By fire.

The last kind of products from the different species of fir is obtained by the action of fire. With this view, a conical cavity is dug out in the earth, communicating at the bottom with a reservoir. Billets of wood are then placed, so as not only to fill the cavity, but to form a conical pile over it, which is covered with turf, and kindled at the top. The

lmission of air is so regulated, that it burns from above
ownwards, with a slow and smothered combustion. The
ood itself is reduced to charcoal, and the smoke and va-
ours formed are obliged to descend into the excavation in
e ground, where they are condensed, and pass along
th the matters liquefied into the receiver. This mixture
denominated Tar, PIX LIQUIDA. *Ed. Lond. Dub.* By
ng boiling, tar is deprived of its volatile ingredients, and
nverted into Pitch, PIX NIGRA. *Lond.*

Tar is a mixture of resin, empyreumatic oil, charcoal, and
etic acid. Its colour is derived from the charcoal; and
e other properties in which it differs from a common re-
n depend on the presence of acetic acid and empyreuma-
c oil.—The acid itself is not only soluble in water, but al-
renders the empyreumatic oil more soluble.

Medical use.—Taken internally, the *turpentines* are active
mulants, open the bowels, and increase the secretion of
ine, to which they give the smell of violets, even though
plied only externally. In all cases accompanied with in-
mmation, they ought to be abstained from, as this symp-
m is increased, and not unfrequently occasioned by them.
ney are principally recommended in gleets, fluor albus,
d the like. Their dose is from a scruple to a drachm and
nalf. They are most commodiously taken in the form of
olus, or blended with watery liquors, by the mediation of
e yolk of an egg, or mucilage. They also may be given
the form of electuary, mixed with twice their weight of
ney, and in the dose of a drachm of the compound twice
thrice a-day; or of clyster, half an ounce being well tri-
rated with the yolk of an egg, and mixed with half a pound
gruel, or decoction of chamomile.

As a medicine, *Oil of turpentine* is highly stimulating and
netrating. Internally it acts as a diuretic or sudorific in
ry small doses. It has also been given in large doses,
xed with honey, principally in those modifications of chro-
c rheumatism which are styled *sciatica*, and *lumbago*. But
has not been often successful, and sometimes has had the
ect of inducing bloody urine.

Lately, however, its use in very large doses has been re-
wed, and with almost invariable success, in one of the most
stinate complaints to which the human body is subject, the
oe worm. For this valuable discovery we are indebted to
r Fenwick of Durham; although its use both in worms
d epilepsy seems to have been previously known to Dr
tham. Cases of its efficacy have also been published by

Drs Bateman and Laird. It has been given even to the extent of four ounces in one dose, without any perceptible bad effects, and scarcely more inconvenience than would follow from an equal quantity of gin. In large doses it is not apt to produce strangury, but only an approach to intoxication, and it generally acts as a speedy purgative, and discharges the worm, in all cases, *dead.*

Dr Ed. Perceval also prescribed it in epilepsy, and with some success. ʒ ii. ʒ iv. or ℥ i. were mixed by means o syrup, with ℔ j. of mint water; and of this emulsion, one or two table spoonfuls were given every four hours. In this form, and given to the extent of several drachms in the course of the day, it produced no distressing symptoms o the urinary organs, stomach, or bowels. It generally procured immediate and decided relief, but it was not always lasting. Dr Latham suggests, that a large dose should a first be given, and then small doses, so as to keep up the affection of the head peculiar to its use.

In Dublin oil of turpentine was given internally as a kind of specific in puerperal peritonitis, by Dr Brennan; and although its stimulating nature seemed to contra-indicate its use in an affection of an inflammatory nature, experience ha shewn that in some cases it produces excellent effects. D Magee says, that he has always found it a safe and efficaciou purgative, and a powerful auxiliary in the cure of some o the most formidable diseases. In obstinate constipation i stands without a rival. In enteritis, peritonitis, colic, and certain inflammatory and spasmodic affections of the abdominal viscera, it acts almost as a specific. It is also efficacious in checking the hæmorrhage in dysentery; and D Magee has used it with success in *hæmorrhœa petechialis* Half an ounce is given for a dose, with an equal quantity o castor oil, and a little aromatic water; and the power it ha of remaining on the stomach, even when nausea is present is remarkable. In smaller doses it generally produces strangury and other unpleasant effects. Some habits, however cannot bear oil of turpentine. I have seen large doses produce temporary intoxication, and sometimes a kind of trance lasting twenty-four hours, without however any subsequent bad effect. The largest dose I have known given has bee three ounces, and without injury.

Externally it often produces excellent effects in indolent tumours; in paralysis of the extremities, and in bruises; i nervous pain and in spasms; and as a styptic, when applied on compresses to the bleeding mouths of the vessels, as ho as the patient can bear it; and in the same manner it forms part of Mr Kentish's treatment of burns.

Tar-water is a heating diuretic and sudorific remedy; but by no means so powerful, or so generally admissible, as it was represented by Bishop Berkeley. Fumigations of tar have been recommended in phthisis by Sir A. Crichton. In some cases of catarrhal phthisis and hepatization they give relief, by exciting expectoration, but never effect a cure of tuberculous phthisis. Tar is applied externally in tinea capitis and some other cutaneous diseases.

Dr Bateman has seen good effects in ichthyosis from *pitch* given internally. It occasioned the rough cuticle to crack and fall off, without the aid of external means, and left a sound skin underneath. This medicine, made into pills with flour, or any farinaceous powder, may be taken to a great extent, ℥ iij. or ʒſs daily, not only without injury, but with advantage to the general health; and affords one of the most effectual means of controlling the languid circulation, and the inert and arid condition of the skin.

PIPER.

Willd. *g.* 74. *Diandria Trigynia.*—Nat. ord. *Piperitæ*, Linn. Juss.

Sp. 1. PIPER NIGRUM. *Lond. Ed. Dub.*

Black pepper.

Off.—The berry.

FRUCTUS PIPERIS NIGRI. *Ed.*
PIPER NIGRUM. Baccæ, Semen. *Dub.*
BACCÆ PIPERIS NIGRI. *Lond.*

THE black pepper is the fruit of a shrubby creeping plant, ndigenous in the East Indies, and cultivated, with much advantage to the fruit, in Java and Malabar. The berries are gathered before they are ripe, and are dried in the sun. They become black and corrugated on the surface; their taste is hot and fiery, and their smell slightly aromatic.

Black pepper has been analysed by Pelletier and by Poucet. Its acrimony depends upon a concrete fixed oil, soluble in ether and alcohol, uniting with unctuous substances, and differing only in its acrimony from other fixed oils. But t also contains a peculiar crystalline matter called *Piperin*, not acrid, melting about 212°, totally insoluble in cold water, in small quantities at 212°, separating as it cools; very soluble, especially at an increased temperature, in alcohol, less so in ether; very soluble in acetic acid, and forming plumose crystals; acetic and alcoholic solutions decomposed by water, not affected by dilute sulphuric, nitric or muriatic acids; decomposed by the concentrated acids; seems not to contain nitrogen. Pepper also yields a substance like the extractive found in legumes by Vauquelin, which has the property of being precipitated by infusion of galls. Besides these principles there is a bland balsamic volatile oil, malic and tartaric acids, starch, bassorin and lignin.

White pepper is the fruit of the same plant, gathered after it is fully ripe, and freed of its external coats by maceration in water. It is smooth on the surface, and less pungent than the black pepper.

Dr Paris informs us, that not only is ground pepper adulterated with the powder of the husks of mustard seed, but that there are artificial pepper corns, which may be easily detected by their falling to powder when thrown into water.

It is singular, that the Sumatrans, who eat such vast quantities of Cayenne pepper, never mix black pepper with their food. They esteem the latter heating, and ascribe a contrary effect to the former; and Mr Marsden, from personal experience, agrees with them.

Sp. 12. Piper longum. *Lond. Ed. Dub.*

Long pepper.

Off.—The fruit.

Fructus piperis longi. *Ed.* Fructus immaturus et siccatus. *Lond.*

Piper longum. Fructus. *Dub.*

The plant which bears the long pepper is also a sarmentaceous climber. The berries are small round grains, disposed spirally in a long cylindrical head. They are gathered before they are ripe, and dried, and are the hottest of all the peppers.

Another species of pepper, the *Cubeb*, has a very striking power of checking and curing gonorrhœa, taken in powder to the extent of ʒ iij. five or six times a-day, and continued for a day or two after the discharge stops. In a few cases it produces swelled testicle, and in one it produced urticaria. Its only sensible effects are purging, discharge of flatus, sometimes increase of urine, and imparting to it its peculiar smell. It is also of use in leucorrhœa. These effects have now been verified by myself, and many others, by repeated experience. Cubebs have been analysed by Vauquelin, who found them to contain an almost concrete volatile oil; a resin like balsam of Copaivi; a colouring gummy principle; an extractive like that of legumes; and some saline matters.

PIPER JAMAICENSE. *Dub.* See MYRTUS.

PISTACIA.
Willd. *g.* 1782. *Diœcia Pentandria.*—Nat. ord. *Amentaceæ,* Linn., *Terebinthaceæ,* Juss.

Sp. 4. PISTACIA TEREBINTHUS. *Lond.*

Off.—The liquid resin called Chian turpentine.

TEREBINTHINA CHIA. Resina liquida. *Lond.*

THE shrub which yields this turpentine grows in India, the north of Africa, and south of Europe; but the turpentine is principally collected in the islands of Chios and Cyprus, by wounding the tree. It does not differ from the other turpentines in any thing material except in its price.--See PINUS.

Sp. 6. PISTACIA LENTISCUS. *Ed. Lond.*

Off.—The resin.

RESINA PISTACIÆ LENTISCI. *Ed.*
MASTICHE. Resina. *Lond.*

THIS species is a native of the same countries with the former. The resin is obtained principally in the island of Chios, by making transverse incisions into the tree, and allowing the juice to harden. It is brought to us in small yellowish, semi-transparent, brittle grains; of a smooth and shining fracture, softening when chewed, fusible, burning with a pleasant smell, insoluble in water, and partially soluble in alcohol and fixed oils. Mastich like other resins is a compound organic body, consisting of two resins, one soluble in cold alcohol, the other only in boiling alcohol, some volatile oil and free acid. Its flavour is communicated to water. It is therefore a resin combined with a little essential oil.

It is principally used by the Turkish women as a masticatory, to preserve the teeth, and to give a pleasant smell to the breath.

PIX BURGUNDICA. *Dub.* See PINUS.

PIX LIQUIDA. *Dub.* See PINUS.

PLUMBUM. *Ed.*
Lead.

Lead is obtained by various processes from its ores. In its metallic form it is scarcely an officinal article, as its different oxides are purchased from the manufacturers, and never prepared by the apothecary.

Lead is of a grey blue livid colour, streak grey, disagreeable taste and odour; specific gravity 11.352; soft; very laminable; hardens little under the hammer; very flexible; not very ductile; slightly tenacious; fusible at 612° Fahrenheit; volatile at a red heat; tarnished in the air; slightly oxidized by air and water; burns when strongly ignited, and in oxygen with a brilliant white flame. It forms three oxides, protoxide yellow, deutoxide red, and peroxide brown, containing 1. 1.5 and 2 proportions of oxygen to 13 metal. When heated in chlorine it unites with it, but it does not inflame. Its phosphuret and sulphuret are brittle; and it is oxidized by, and combines with the sulphuric, nitric, phosphoric, and other acids. Its oxide imparts to glass a uniform density, and strong refracting power.

Medical use.—Its effects on the body are emaciation, violent colics, paralysis, tremors, and contractions of the limbs; and as they generally come on gradually, the cause is sometimes overlooked till it be too late. Poisoning from lead is never intentional, but only accidental, either from liquors becoming impregnated with lead, by being improperly kept in vessels lined or glazed with lead, or by having lead criminally added to them to correct their acidity; or among manufacturers who work much with lead, as painters and plumbers, and who are not sufficiently attentive to avoid swallowing it.

The presence of lead in any suspected liquor is detected by the hydro-sulphuret of potass, which forms with it a brown or black precipitate, not soluble in diluted muriatic acid; and still more certainly, by evaporating a portion of the liquor to dryness, and exposing the extract to a heat sufficient to reduce the lead.

OXIDUM PLUMBI SEMIVITREUM. *Ed. Lond.*
LITHARGYRUM. *Dub.*
Semi-vitrified oxide of lead. Litharge.

IF oxidized lead be melted with a quick fire, it gets the appearance of oil, and on cooling concretes into litharge. Greatest part of the litharge met with in the shops is produced in the purification of silver from lead, and the refining of gold and silver by means of this metal. According to the degree of fire and other circumstances, it has a pale or deep colour; the one has been commonly called Litharge of silver, the other Litharge of gold.

The oxides of lead dissolve by heat in expressed oils; these mixtures are the bases of several officinal plasters and ointments.

Lead and its oxides, when undissolved, have no considerable effects as medicines. Dissolved in oils, they are supposed to be (when externally applied) anti-inflammatory and desiccative. Combined with vegetable acids, they are remarkably so; and taken internally, prove powerful, though dangerous styptics.

PLUMBI SUBCARBONAS, s. s. Subcarbonas plumbi. *Lond.*
CARBONAS PLUMBI, *vulgo* Cerussa. *Ed.*
CERUSSA, s. s. Subacetas plumbi. *Dub.*

White oxide of lead. Ceruse. White lead. Subacetate of lead. Carbonate of lead. Subcarbonate of lead.

THIS substance is prepared by exposing lead to the vapour of vinegar. To accelerate the oxidizement, the lead is cast in thin plates, which are rolled up spirally. A number of these are placed perpendicularly on a support, over a flat vessel containing vinegar, which is converted into vapour by a gentle heat, such as that of dung. The plates become slowly covered with a white crust, which is in due time removed; and the remains of the plates are again exposed to the vapour of vinegar, until they be entirely corroded. Van Mons says, that if lead ashes be dissolved in nitric acid, and precipitated by chalk in impalpable powder, the precipitate, when washed and dried, will be ceruse in its purest state.

White oxide of lead has a scaly or foliated texture, is brittle, friable, heavy, of a snowy whiteness, and a sweet taste. It is often adulterated with earthy substances, which may be discovered by mixing it with oil, and reducing the lead in a crucible. Although very friable, the coarser particles cannot be separated by means of a sieve, because its interstices soon get filled up. It can only be obtained in a state of a fine powder, by rubbing a loaf of ceruse on a sieve placed over a sheet of paper. It consists of 14 yellow oxide of lead, and 2.75 carbonic acid.

In pharmacy the white oxide of lead is used in the composition of ointments and plasters.

OXIDUM PLUMBI RUBRUM. *Ed.*
Red oxide of lead. Red lead.

THE preparation of red lead is so troublesome and tedious, that the preparation of it forms a distinct branch of business.

The manufacturers melt large quantities of lead at once, upon the bottom of a reverberatory furnace built for this purpose, and so contrived, that the flame acts upon a large surface of the metal, which is continually changed by means of iron rakes drawn backwards and forwards, till the fluidity of the lead is destroyed; after which, the oxide is only now and then turned. It is the deutoxide, and contains lead 13, oxygen 1.5.

The red oxide of lead is obtained in the form of a very heavy powder, consisting of minute shining scales, of a bright scarlet, verging towards yellow, especially if triturated. It is sometimes adulterated with red oxide of iron, red bole, or powdered brick. These frauds are detected by the inferiority of colour, by mixing it with oil, and subjecting it to the test of reduction; and by its forming a black precipitate with tincture of galls, when dissolved in nitrous acid.

POLYGALA SENEGA. *Ed. Lond. Dub.*

Willd. *g.* 1313, *sp.* 67. *Diadelphia Octandria.*—Nat. ord. *Lomentaceæ,* Linn., *Polygaleæ,* Juss.

Seneka, or Rattlesnake root.

Off.—The root.

RADIX POLYGALÆ SENEGÆ. *Ed.*
RADIX SENEGÆ. *Lond.*
RADIX SENEKÆ. *Dub.*

SENEKA is a perennial plant which grows wild in North America, particularly Virginia and Pennsylvania. This root is usually about the thickness of the little finger, variously bent and contorted, and appears as if composed of joints, whence it is supposed to resemble the tail of the animal whose name it bears; a kind of membranous margin runs on each side the whole length of the root.

The bark is the active part of the root. Its taste is at first acrid, afterwards very hot and pungent. It has no smell.

Its acrimony resides in a resin; for it is entirely extracted by alcohol; is precipitated by water; does not rise in distillation; and is not destroyed by keeping.

Medical use.—It is an active stimulus, and increases the force of the circulation, especially of the pulmonary exhalents. It has therefore been found useful in typhoid inflammations of the lungs; but it is apt to disorder the stomach, and to induce diarrhœa. Dr Brandreth of Liverpool derived great benefit in some cases of lethargy from an extract of seneka combined with carbonate of ammonia.

Some have likewise employed this root in hydropic cases, and not without success. There are examples of its occasioning a plentiful evacuation by stool, urine, and perspiration; and by this means removing the disease, after the common diuretics and hydragogues had failed.

The Senegaro Indians are said to prevent the fatal effects of the bite of the rattlesnake, by giving it internally, and by applying it externally to the wound.

The usual dose of the powder is 30 grains or more.

Externally, it has been advantageously used as a stimulating gargle in croup.

POLYGONUM BISTORTA. *Ed. Lond. Dub.*

Willd. *g.* 785, *sp.* 3. Smith, *g.* 196, *sp.* 6. *Octandria Trigynia.*—Nat. ord. *Oleraceæ*, Linn., *Polygoneæ*, Juss.

Great bistort, or snakeweed.

Off.—The root.

RADIX POLYGONI BISTORTÆ. *Ed.*
RADIX BISTORTÆ. *Lond. Dub.*

BISTORT is perennial, and grows wild in moist meadows in several parts of Britain. It flowers in June. The root is about the thickness of the little finger, of a blackish-brown colour on the outside, and reddish within; it is twisted or bent vermicularly (whence the name of the plant,) with a joint at each bending, and full of bushy fibres; the root of the species here mentioned has, for the most part, only one or two bendings, others have three or more. All the parts of bistort have a rough austere taste, particularly the root, which is one of the strongest of the vegetable astringents.

Medical use.—It is employed in hæmorrhagies and other fluxes, both internally and externally, where astringency is the only indication. To the sudorific, antipestilential, and antiseptic virtues attributed to it, it has no other claim than what it derives from its astringency.

PORRI RADIX. *Lond.* See ALLIUM.

POTASSÆ SUB-CARBONAS IMPURUS, v. s. Anglice Pearl Aſhes. *Ed.*
POTASSA IMPURA, s. s. Sub-carbonas potassæ impura. *Lond.*
CINERES CLAVELLATI, s. s. Kali impurum. *Dub.*

Pearl ashes. Potashes. Impure carbonate of potass. Fixed vegetable alkali.

THE potashes of commerce are sent to us from the shores of the Baltic and from America. They are prepared by lixiviating the ashes of vegetables in barrels, first with cold, and then with hot water, filtering the ley, and evaporating it to dryness in an iron pot. In this state they still contain some vegetable matter, not perfectly incinerated, which gives them a brown or black colour. To destroy this, and render their colour purer, they are put into a crucible and liquefied in an intense heat. The melted matter is poured out on iron plates, where it hardens. It now gets the name of pearl ashes; but even yet it is very impure, and often contains the sulphates of potass and of lime, and the muriate of potass. It is also frequently adulterated with vegetable ashes, sand and sulphate of potass. The ashes are detected by their difficult and imperfect solution; the sand, by the precipitation of silica in a gelatinous form on the addition of an acid, and the sulphate of potass by its crystallization. All vegetables which grow at a distance from the sea afford potashes by incineration: herbs (especially wormwood) give the largest proportion, then the leaves of trees, then shrubs, and woods the least. The alkali, thus obtained, formerly had the name of Fixed Vegetable Alkali; but it is also found, though much more sparingly, both in the animal and mineral kingdoms.

Vauquelin has given a table of the quantity of pure potass, and of heterogeneous matters, contained in 1152 parts of the different potashes of commerce.

	Potass.	Sulphate of potass.	Muriate of potass.	Insoluble residuum.	Carb. acid and water.
Pearl ashes,	754	80	4	6	308
Russian potashes,	772	60	5	56	254
Dantzic ashes,	603	152	14	79	204
American potashes,	857	145	20	2	119
Potashes of Treves,	720	165	44	24	199
Potashes of Vosges,	444	148	510	34	304

The potass was estimated by the quantity of diluted nitrous acid saturated by it; the sulphate of potass by the precipitate formed with nitrate of baryta; and the muriate of potass by that formed with nitrate of silver.

All these different potashes, except the last, may be purified sufficiently for pharmaceutical purposes, by lixiviating them with a small proportion of cold water, and evaporating the ley to dryness in an iron pot.

Medical use.—Carbonate of potass is useful in all diseases depending upon the presence of an acid in the primæ viæ, by neutralizing it, and forming with it an aperient salt. Hence Dr Mitchell strongly recommends the use of potash cakes to infants, in order to counteract the acidity of their bowels. Alkalies are by many supposed to attenuate the fluids, remove obstructions, and promote the natural secretions. Weak solutions of alkalies prove diuretic, or, if assisted by warmth, diaphoretic. In large doses, potash has been given as a lithontriptic, but its long continued use necessary in calculous complaints, seldom fails to injure the intestinal canal and constitution. Dr Mitchell strongly recommends alkalies in fevers and dysenteries. Administered by the mouth, they are supposed to neutralize the septic acid in their passage through the bowels. Injected in clysters, they are said to allay tenesmus like a charm, and in both cases to mitigate pain, moderate spasmodic action, and restore and equalize the peristaltic motion; moreover, effectually to destroy the fetor and infection of the stools. The effects of alkalies upon the irritability in galvanic experiments led to their use, alternated with the free exhibition of opium, in tetanic and other spasmodic diseases. Externally alkalies are used in form of lotion, in rachitic and some cutaneous diseases, and as a stimulant to the inactive state of the vessels in certain ulcers.

POTASSÆ NITRAS, s. s. Nitras potassæ purificata. *Lond.*
NITRAS POTASSÆ. *Ed.*
NITRUM, s. s. Nitras kali. *Dub.*
Nitrate of potass. Purified nitre.

NITRATE of potass is annually produced on the surface of the earth in many countries. For this production, the presence of felspar to furnish the alkali, and carbonate of lime, and an open, but not too free communication with dry atmospheric air, are requisite. The putrefaction of organic, especially animal, substances is not necessary to, but accelerates the formation of this salt, by affording the nitrogen in a state in which it combines readily with the oxygen of the atmosphere, and forms the nitric acid. Accordingly, in Germany and France, nitrate of potass is prepared, by exposing mixtures of putrefying animal and vegetable substances, and calcareous earths, to the action of the atmosphere. The salt is afterwards extracted by lixiviation and crystallization. The nitre used in this country is chiefly imported from the East Indies. As it occurs in commerce, it often contains a little muriate of potass and muriate of soda, from which it is nearly purified by dissolving it in boiling water, and filtering it; on cooling, the nitrate of potass crystallizes, and the other salts remain dissolved.

Nitrate of potass has a sharp, bitterish, cooling taste. It shoots in pretty large crystals, which are generally six-sided prisms, terminated by six-sided pyramids; very brittle; permanent in the atmosphere; soluble in seven times their weight of water at 60°, and in an equal weight at 212°; melting when exposed to a strong heat, giving out at first oxygen, and afterwards nitrogen gas, until the whole acid be decomposed, and the potass alone remain behind. It deflagrates more or less violently with all oxygenizable substances, oxidizing or acidifying them. Nitre is an anhydrous salt, and any water which it may contain is only adhering among the molecules of its crystals. It consists of nitric acid 6.75, potash 6 = 12.75. It is decomposed by the sulphuric acid and baryta, by the muriate and acetate of baryta, and the sulphate of soda, ammonia, magnesia and alumina.

Medical use.—Taken to the extent of from a drachm to half an ounce in the course of a day, in repeated doses, it diminishes the heat of the body, and the frequency of the pulse, operates by stool, and acts upon the secretion of urine, but is apt to produce pains in the stomach. In large doses, such as an ounce, taken at one time, it produces the most dreadful symptoms, constant bloody vomiting, purging, convulsions, and death. Accidents of this kind have happened, from its being sold, by mistake, for sulphate of soda.

It is best given in small doses, as from five to ten grains, frequently repeated, and is only admissible in inflammatory diseases. Externally it is used in gargles for inflammatory sore throats.

POTASSÆ SULPHAS. *Lond.*

Sulphate of potash.

The London College have now introduced this salt into the Materia Medica, as an article which may be purchased; but they have retained the formula for its preparation, to which we refer.

POTASSÆ SUPERTARTRAS, s. s. Supertartras potassæ purificata. *Lond.*

SUPER-TARTRAS POTASSÆ. *Ed.* v. s. Tartarus purificatus; Crystalli tartari. *Ed.*

CRYSTALLI TARTARI. *Dub.*

Super-tartrate of potass. Crystals of tartar, and Cream of tartar.

SUPER-TARTRAS POTASSÆ IMPURUS, v. s. Tartarus crudus. *Ed.*
TARTARUM, s. s. Potassæ super-tartras impura. *Lond.*
TARTARUM. *Dub.*

Impure super-tartrate of potass. Tartar.

TARTAR exists in verjuice and in must, and is gradually deposited on the sides of the casks in which the wine is made, from which it is scraped before the next vintage, to prepare the casks to receive the new wine. The deepest coloured and roughest wines generally give most tartar; and it gets the name of white or red tartar according to its colour.

It is purified by dissolving it in boiling water, and filtrating the boiling solution, which, on cooling, deposites irregular crystals, containing the oily and colouring matters. These are separated by boiling the crystals with a white clay. At Venice, they are purified by dissolving them in water, and clarifying them with whites of eggs and ashes. The tartar, thus purified, when crystallized, or in powder, is called Cream of Tartar.

Its crystals are small and irregular, and do not melt in the mouth, but feel gritty under the teeth. It has an acrid harsh taste. It is soluble in sixty times its weight of water at 60°, and in thirty at 212°. It is decomposed, and its acid is destroyed by heat. Its constituents are 16.5 acid, 6 potass, 2.25 water = 24.75.

Medical use.—The virtues of tartar are those of a mild, cooling, aperient, laxative medicine. It is much used in dropsy; and some allege, that it has good effects as a deobstruent in dropsy from scirrhus. Taken from half an ounce to an ounce, it proves a gentle, though effectual purgative. Given in smaller doses, and in solution, it often acts as a powerful diuretic.

PRUNUS DOMESTICA. *Ed. Lond. Dub.*

Willd. *g.* 982, *sp.* 29. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ*, Linn., *Rosaceæ*, sect. *Pomaceæ*, Juss.

Plum-tree.

Off.—The dried fruit called French prunes.

FRUCTUS PRUNI DOMESTICÆ. *Ed.*
PRUNA; Drupæ exsiccata pruni domesticæ. *Dub. Lond.*

This tree is found wild in hedges in England, but has probably originated from the stones of the cultivated kinds being dropt there by accident. It flowers in April. Great quantities of the dried fruit are imported from the Continent, of which the French prunes are reckoned the best.

Medical use.—They contain much mucilaginous and saccharine matter, and their medical effects are, to abate heat and gently loosen the belly, which they perform by lubricating the passages, and softening the excrement. They are of considerable service in costiveness, accompanied with heat or irritation, which the more stimulating cathartics would tend to aggravate; where prunes are not of themselves sufficient, their action may be promoted by joining with them a little rhubarb, or the like, to which may be added some carminative ingredient, to prevent their occasioning flatulency.

PTEROCARPUS.

Willd. *g.* 1318. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ*, Linn., *Leguminosæ*, sect. *Papilionaceæ*, Juss.

Sp. 6. PTEROCARPUS SANTALINUS. *Ed. Lond. Dub.*

Off.—Red Saunders wood.

LIGNUM PTEROCARPI SANTALINI. *Ed.*
LIGNUM PTEROCARPI. *Lond.*
LIGNUM SANTALI RUBRI. *Dub.*

This tree grows in the East Indies, and acquires a very large size. The wood is brought in large billets, of a compact texture, a dull red, almost blackish colour on the outside, and a deep brighter red within. It has no manifest smell, and little or no taste. It communicates a deep red to alcohol, but gives no tinge to water. M. Pelletier separated the colouring matter, *santalin*, which he found to have great analogy with the resins; insoluble in water; soluble in alcohol, ether, acetic acid and alkaline solutions; it forms beautifully coloured precipitates with many metallic solutions. Its acetic solution acts like tannin upon gelatin. It contains no azote.

Sp. 1. PTEROCARPUS DRACO. *Ed.*

Off.—The resin called Dragon's blood.

RESINA PTEROCARPI DRACONIS.

This is also a very large tree. It is a native of South America, and the resin which exudes from incisions made in its bark used to be frequently sent from Carthagena to Spain. Many other trees furnish a red juice concreting into a similar resin, as the *Pt. Indicus* and *santalinus*, the *Dracœna draco*, *Dalbergia monetaria*, and *Calamus draco.*

Hayne says, that although the resin of the *Pt. draco* was formerly sent in abundance from Carthagena to Spain, it no longer occurs in commerce, on account of the decreased demand for dragon's blood, and that the dragon's blood of commerce comes chiefly from the *Calamus draco*, and also from *C. verus* and *C. rudentum.* It is obtained from the fruit, which, when fully ripe, are covered with a crust of a red resinous substance. This is separated by stamping them gently in a mill, or shaking them in a sac, and is then formed by the assistance of heat into balls about the size of a nutmeg; or it may be got by steaming and boiling the fruit in water. The balls are put up in the cases woven of the leaves of the *Licuala spinosa*, and the most esteemed are the *S. D. in guttis.* It also occurs in cylindrical rolls, put up in the same manner. A second sort is in larger or smaller fragments, and is called *S. D. in granis*, and is often finer and better than the preceding. A third sort, *in placentis*, in cakes of several ounces weight, is got by boiling the bruised fruit after the former kinds have been separated; and a fourth, *in tabulis*, is altogether a sophisticated mixture of colophony, powdered red saunders, with a little true dragon's blood.

This drug, in substance, has no sensible smell or taste; when dissolved, it discovers some degree of warmth and pungency. It is fusible and inflammable, and almost totally soluble in alcohol, tinging a large quantity of the menstruum of a deep red colour. It is likewise soluble in expressed oils, and gives them a red hue, less beautiful than that communicated by Anchusa. It is not acted upon by water, but precipitated by it from its alcoholic solution. I found that it is soluble in nitrous acid and alkalies, and that it neither precipitates gelatin, nor affects the colour of the salts of iron. It therefore appears to be a pure resin, without any astringency. The same conclusion has since been made by Melandri, by whom dragon's blood has been lately analyzed, and found to consist chiefly of a new alkaloid, which he has named *Draconin.* He prepares it by decomposing the tincture acidulated with sulphuric acid by water, and washing well with water the precipitate, which is sulphate of draconin. This is a red uncrystallizable mass, very sparingly soluble in water, more soluble in alcohol, and easily decomposed by alkalies. It melts at a gentle heat, and when decomposed seems to contain no nitrogen. *Sanguis draconis in placentis* consisted almost entirely of draconin; but that *in guttis* or *lachrymis* contained little. Dr Fothergill, who first described kino, received it as the finest dragon's blood. Mr Proust must have been misled by some similar misinformation, as the characters of his *sang dracon* correspond with those of kino.

PULEGIUM. *Lond. Dub.* See MENTHA.

PUNICA GRANATUM. *Ed. Lond. Dub.*

Willd. *g.* 980, *sp.* 1. *Icosandria Monogynia.*—Nat. ord. *Pomaceæ,* Linn., *Myrtineæ,* Juss.

Pomegranate tree.

Off.—Pomegranate bark. The double flowers, called Balaustine.

a) CORTEX GRANATI. Pomorum cortex. *Lond.*
CORTEX PERICARPII PUNICÆ GRANATI. *Dub.*
b) FLORES GRANATI. *Dub.*

THE pomegranate is a low tree, growing wild in Italy and other countries in the south of Europe. It is sometimes met with in our gardens.

The pulp of the fruit is sub-acid, allaying heat, quenching thirst, and gently loosening the belly. The rind of the frui is a strong astringent, striking a permanent blue with sulphate of iron, and as such is occasionally made use of. I has been given by Dr Buchanan and others with success in the East Indies for the cure of tænia. I also made some trials of it and of catechu in this country, on the supposition that it was the astringent principle which acted chemically on the gelatinous body of the worm, and the result was promising; but the introduction of the oil of turpentine superseded the necessity of prosecuting the experiment.

The flowers are of an elegant red colour, in appearance resembling a dried red rose. Their taste is bitterish and astringent. They are recommended in diarrhœas, dysenteries, and other cases where astringent medicines are proper

PYRETHRI RADIX. *Lond. Dub.* See ANTHEMIS.

PYRUS CYDONIA. *Lond.*

Willd. *g.* 992, *sp.* 17. *Icosandria Pentagynia.*—Nat. ord *Pomaceæ,* Linn., *Rosaceæ,* sect. *Pomaceæ,* Juss.

Off.—Quince seeds.

SEMINA CYDONIÆ. *Lond.*

THE quince is originally a native of Crete, but ripens its ruit perfectly in England.

Quinces have a very austere acid taste: taken in small uantity, they are supposed to restrain vomiting and alvine luxes; and more liberally, to loosen the belly. The coat f the seeds, *episperm*, abounds with a mucilaginous subtance, of no particular taste, which it readily imparts to waery liquors; an ounce of the seeds will render three pints of vater thick and ropy, like the white of an egg. They will iot, however, supply the place of gum arabic, because their nucilage spoils very quickly, and is precipitated by acids.

QUASSIA *.

Willd. *g.* 849. *Decandria Monogynia.*—Nat. ord. *Gruinaes*, Linn., *Simarubæ*, Juss.

Sp. 2. QUASSIA SIMARUBA. *Ed. Lond. Dub.*

Mountain or bitter damson.

Officinal—The bark and wood.

a) CORTEX QUASSIÆ SIMARUBÆ. *Ed.*
CORTEX SIMAROUBÆ. *Lond. Dub.*
b) LIGNUM SIMAROUBÆ. *Dub.*

THIS tree grows in Guiana, and yields a milky juice when ounded. The simarouba of the shops is the bark of the oot. It is brought to us in pieces some feet long, and some ıches broad, folded lengthwise. It is light, fibrous, very ough; of a pale yellow on the inside; darker coloured, ough, scaly, and warted on the outside; has little smell, and bitter, not disagreeable taste. It gives out its bitterness oth to alcohol and water. Murray of Gottingen remarkd that the bark of Wright's *Simaruba amara* was tougher, ıuch paler, and beset on its outer surface with small, almost alked, warts, and tasted very bitter.

Medical use.—It has been much celebrated in obstinate iarrhœa, dysentery, anorexia, indigestion, lienteria, and inermittent fevers.

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* The genus *Quassia*, as constituted by Linnæus, included trees, some of hich had hermaphrodite flowers, and others were monoicous, or polygamous. ecandolle in a monography separated them, retaining the name Quassia for e hermaphrodite species, of which the true *Quassia amara* is one, and giving e generic name *Simaruba* to the others, amongst which are both our officinal ecies, *Simaruba officinalis* and *Simaruba excelsa.*

It is given in powder, in doses of half a drachm, or a whol drachm; but it is too bulky, and very difficultly pulverizabl It is best exhibited in decoction. Two drachms of the bar may be boiled in two pounds of water to one, and the decoction drunk in cupfuls in the course of the day.

Sp. 3. Quassia excelsa. *Ed. Lond. Dub.*

Quassia tree.

Officinal.—The wood.

Lignum quassiæ excelsæ. *Ed.*
Lignum quassiæ. *Lond. Dub.*

The quassia of the shops is the wood of this lofty tre which grows in Jamaica, and in the Caribæan islands.

It is brought in billets about the thickness of a man's arm is very light, whitish, becoming yellowish by exposure to t air. Hayne agrees with Martins in thinking that the g nuine quassia of Surinam is the production of the *Quass amara*, a diminutive tree or shrub, and that the officinal wo is now not from the root, but from the branches. Quass has no sensible odour, but is one of the most intense a durable pure bitters known. Its infusion, decoction a tincture are almost equally bitter, are yellowish, and are n blackened by chalybeates. The properties of the extract quassia have been detailed by Dr Thomson, under the ti of the Bitter principle.

Medical use.—It is a very pure and simple bitter, and m be given in all cases where bitters are proper. It has be exhibited in intermittent and bilious fevers, in stomac complaints, in lienteria, in cachexy, dropsies, leucorrhœ and gout. It is much used in this country to give the b terness to malt liquors, though it subjects those brew who employ it to a very heavy penalty. It evidently h narcotic power, from its being used to poison flies.

It can scarcely be reduced to a sufficient fine powder be given in substance, and is therefore generally given the form of infusion, decoction, or extract.

Quercus.

Willd. *g.* 1692. Smith, *g.* 404. *Monœcia Polyandria.* Nat. ord. *Amentaceæ*, Linn., *Cupuliferæ*, Juss.

Sp. 65. Willd. Quercus pedunculata. *Lond.*
Sp. 1. Smith. Quercus robur. *Dub. Ed.*

Common British oak.

Off.—Oak bark.

CORTEX QUERCUS ROBORIS. *Ed.*
CORTEX QUERCUS. *Lond. Dub.*

THE oak grows wild in Britain, and flowers in April. The ıperior excellence of its wood for ship-building has render-l its cultivation an object of national concern. Its saw-ust is an useful dye-stuff, and its bark is the principal arti-e used in tanning. M. Vauquelin has discovered a re-ıarkable chemical difference between the bark and nut-alls, the latter precipitating tartrate of antimony and infu-ıon of cinchona, which are not acted on by the former.

Medical use.—Oak bark is a strong astringent, and is use-ıl in hæmorrhagies, alvine fluxes, and other preternatural r immoderate secretions. It is so difficultly reduced to a ıfficiently fine powder, that it can scarcely be given inter-ally in substance. It is chiefly used externally in the form f decoction. Its extract is sometimes so prepared as to be ɔld for kino. Formerly the acorns and their cups were ıuch used after being roasted and powdered.

QUERCUS MARINA. *Dub.* See FUCUS.

RAPHANUS RUSTICANUS. *Dub.* See COCHLEARIA.

RESINA ALBA. *Dub.* See PINUS.

RHAMNUS CATHARTICUS. *Ed. Dub. Lond.*

Willd. *g.* 405, *sp.* 1. Smith, *g.* 105, *sp.* 1. *Pentandria Mo-ogynia.*—Nat. ord. *Dumosæ*, Linn., *Rhamneæ*, Juss.

Purging buckthorn.

Off.—The berry. The juice of the berries.

SUCCUS RHAMNI CATHARTICI. *Ed.*
BACCÆ RHAMNI. *Lond.*
BACCÆ RHAMNI CATHARTICI. *Dub.*

THIS tree or bush is common in hedges; it flowers in May and June, and ripens its fruit in September or the beginning of October. In our markets, the fruit of some ɔther trees, as the blackberry bearing alder and the dog-ɔerry tree, have been frequently mixed with, or substituted for those of buckthorn. This abuse may be discovered by ɔpening the berries; those of buckthorn have almost always four seeds, of the alder two, and of the dogberry only one.

Buckthorn berries, bruised on white paper, stain it of a green colour, which the others do not. Those who sell the juice to the apothecaries are said to mix it with a large proportion of water.

Med. use.—Buckthorn berries have a faint disagreeable smell, and a nauseous bitter taste. They were long in considerable esteem as cathartics, and celebrated in dropsies, rheumatisms, and even in the gout. They generally occasion gripes, sickness, dry the mouth and throat, and leave a thirst of long duration. The dose is about twenty of the fresh berries in substance, and twice or thrice this number in decoction; an ounce of the expressed juice, or a drachm of the dried berries.

RHEUM.

Willd. *g.* 803. *Enneandria Trigynia.*—Nat. ord. *Oleraceæ,* Linn., *Polygoneæ,* Juss.

Sp. 3. RHEUM PALMATUM. *Lond. Dub.*

Palmated rhubarb.

Off.—The root.

RADIX RHEI. *Lond. Dub.*

Sp. 2. RHEUM UNDULATUM. *Dub.*

Off.—The root.

RADIX RHEI UNDULATI. *Dub.*

RADIX RHŒI. *Ed.*

a) RHEUM RUSSICUM *vel* TURCICUM. *Ed.*

b) RHEUM SINENSE *vel* INDICUM. *Ed.*

c) RHEUM BRITANNICUM. *Ed.*

Turkey, China, and British rhubarb, got from the palmated rhubarb and other species.

BOTH of these species grow spontaneously in China, and endure the cold of our climate.

But it is not ascertained that the true rhubarb is the dried root of either the one or the other. Pallas thinks that it is obtained indiscriminately from the *rheum undulatum, palmatum,* and *compactum,* more especially from the first; while Mr Sievers, an apothecary who was sent by Catherine II. on purpose to obtain the true rhubarb plant, and travelled for seven years in the countries contiguous to that whence the rhubarb is brought, is of opinion, that the botanical characters of the plant, which furnishes it, are still unknown, excepting that it is said not to grow to a great size, and to have round leaves, which are toothed on the edges with almost spinous points.

All the rhubarb of commerce grows on the chain of lofty mountains in Chinese Tartary, which stretches to the lake Koko-Nor, near the source of the river Chorico, between 35° and 40° north latitude and 100° longitude. It is dug up by the peasants, cleaned from the earth, cut in pieces, strung with the bark on strings, and exposed to dry under cover in the shade for a whole year, when it is again cleaned and prepared for exportation.

There is a distinction made in commerce between the Russian and Chinese rhubarb, although they both come from the same country.

The Russian, improperly called by us Turkey rhubarb, is dearer, and always good, as very great attention, both in purchasing and transporting it, is paid by order of the government. It is brought from the Chinese town Sini or Selim by the Bucharians. In Kiachta, on the Russian frontier, it is received by a Russian apothecary, who examines it. The bad is immediately burnt, and the good is freed from its bark, woody parts, and every impurity, in the most careful manner. It is then sent to Moscow and to Petersburgh, where it is again examined.

It is commonly in round pieces, of a reddish or whitish-yellow colour, feels gritty between the teeth, and is often perforated with so large a hole, that many pieces have the appearance of a mere rind.

The Chinese or East Indian rhubarb is brought by sea from Canton. It is heavier, harder, and more compact than the other; seldom perforated with holes, and is either in long pieces, or with two flat sides, as if they had been compressed. Dr Lewis thinks that this is less aromatic, but stronger, than the Turkey; and that it has required less care in drying, from having been lifted when the root was less watery.

The general characters of good rhubarb are, its having a whitish or clear yellow colour, being dry, solid, and compact, moderately heavy, brittle; when recently broken, appearing marked with yellow or reddish veins, mixed with white; being easily pulverizable; forming a powder of a fine bright yellow, having the peculiar, nauseous, aromatic smell of rhubarb, and a sub-acrid, bitterish, somewhat astringent taste, and when chewed feeling gritty under the teeth, speedily colouring the saliva, and not appearing very mucilaginous. The size and form of the pieces are of little consequence; only we must break the large ones, to see that they are not decayed or rotten within; and we must also observe that they are not musty or worm-eaten. This is the more necessary, as damaged pieces are frequently so artfully dressed up, and coloured with powder of rhubarb, as to impose on the buyer.

Rhubarb has been analysed by many chemists. It contains some volatile odorous matter, on which its peculiar nauseous smell, and its activity as a purge, depend; for when dissipated, either by age or any preparation to which the rhubarb has been subjected, the powers of the medicine are almost destroyed. Water dissolves almost all its active principles. The infusion is dark-red, and the residuum whitish, without smell or taste, and crackling under the teeth. When the watery extract is treated with alcohol, a proportion of white tasteless matter is left, having the properties of gum arabic, while the tincture possesses all the distinctive peculiarities of rhubarb. The gritty matter, considered by Model to be sulphate of lime, was ascertained by Scheele to be oxalate of lime; and his conclusion has been verified by Heyer, Schrader and others; but Mr Brande was unable to find it in any specimen he examined. Henry of Paris has also given a comparative result of the analysis of three kinds of rhubarb, Russian, Chinese, and French. The following table shews the result of the several analyses:

	Russian.			*Chinese.*	*Indigenous.*	
Resin,	10.	4.8	44	39.35	54.8	2.8
Extractive,	26.	26.4				24.
Gum,	31.		5.5	6.	6.36	14.8
Starch,		12.8	4.8	12.86	17.432	
Albumen ?				0.2		
Oxalate of lime,	—	4.5	29.98	32.8	10.522	9.
Phosphate of lime,	2.					
Malate of lime,	6.5					
Lignin,	16.3	49.5	10.62	11.2	11.246	47.
Water,	8.2					

The 1st is by Mr Brande of London, the 2d and 6th by Schrader, and the 3d, 4th and 5th by Henry. Their discrepancies, which cannot be reconciled, shew the difficulty of the subject. The most important principle is that named in the table Extractive. Mr Brande describes it, "Extract, "tan, and gallic acid;" Pfaff and Henry as a principle; while Hornemann, more recently, is said to have discovered that it is a compound, containing, however, a proximate principle, to which he has given the name of *Rheumin*. *Rhabarbarin*, according to Pfaff, when dry, is dark brown, opaque, shining, and a peculiar nauseous bitter, slightly astringent taste, and of a peculiar nauseous smell. It is deliquescent, and completely soluble in four waters; the solution yellow inclining to red, and does not sensibly redden litmus paper. It is soluble in alcohol and ether. Its colour is deepened, but there is no precipitate with lime or barytic water, or solutions of alkalies or their carbonates, nor by tincture of galls, or solution of alum or tartar emetic. It forms with a solution of gelatin a moderate loose, flocculent, reddish yellow precipitate, and throws down the persalts of iron of a dirty green. It is copiously precipitated by goulard and sugar of lead, but not affected by solution of tin, quicksilver, or zinc.

Various species of rhubarb, especially the palmatum, are cultivated in this country, and sometimes in very large quantities; so that there can be no doubt that the roots, the growth of this country, may be so prepared as to have the appearance, at least, of foreign rhubarb. The greatest difficulty seems to be the drying it properly, as it is commonly pasty under the pestle. British rhubarb, as it is called, is cultivated in considerable quantities in the neighbourhood of Edinburgh. The leaf-stalks of rhubarb contain a pleasant acid juice, and are used in spring for making tarts, which are very like those of apples, but more acid; and Olivier tells us that the Persians have long been in the habit of using the *Rheum ribes* in the same manner, preserved or raw. Mr Henderson has examined the acid, which he considers as peculiar, and has named *Rheumic acid*.

Medical use.—Rhubarb is a mild cathartic, which operates without violence or irritation, and may be given with safety even to pregnant women and to children. In some people, however, it occasions severe griping. Besides its purgative quality, it is celebrated as an astringent, by which it increases the tone of the stomach and intestines, and proves useful in diarrhœa and disorders proceeding from laxity.

Rhubarb is exhibited,

1. In substance, in the form of powder. It operates more powerfully as a purgative in this form than in any other. The dose for an adult is about a scruple or upwards. On account of its great bulk, it is sometimes unpleasant to take a sufficient dose; its laxative effects are therefore often increased by the addition of neutral salts, or other more active

purgatives. In smaller doses it often proves an excellent stomachic.

2. In infusion. Rhubarb yields more of its purgative property to water than to alcohol. The infusion is, however, considerably weaker than the powder, and requires double the dose to produce the same effect. It is well adapted for children, but must be always fresh prepared.

3. In tincture. On account of the stimulating nature of the menstruum, this preparation frequently cannot be exhibited in doses large enough to operate as a purgative. Its principal use is as a tonic and stomachic.

The virtues of rhubarb are destroyed by roasting, boiling, and in forming the extract.

RHODODENDRON CHRYSANTHUM. *Ed.*

Willd. *g.* 867, *sp.* 7. *Decandria Monogynia.*—Nat. ord. *Bicornes*, Linn., *Erinaceæ*, Juss.

Yellow-flowered rhododendron.

Off.—The leaves.

FOLIA RHODODENDRI CHRYSANTHI. *Ed.*

THIS small shrub grows in the coldest situations, and highest parts of the snow-covered mountains in East Siberia, and especially in Dauria. The leaves are oblong, rigid, reflected at the edges, rough on the upper surface, smooth, and paler on the lower. When dried, they have no smell, but a rough, astringent, and bitterish taste. They also contain a stimulant narcotic principle; for they increase the heat of the body, excite thirst, and produce diaphoresis, or an increased discharge of the other secretions or excretions, and, in a large dose, inebriation and delirium.

Medical use.—In decoction, it is used in Siberia in rheumatism and gout. About two drachms of the dried shrub are infused in an earthen pot, with about ten ounces of boiling water, keeping it near a boiling heat for a night, and the infusion taken in the morning. Besides its other effects, it is said to produce a sensation of prickling or creeping in the pained parts; but in a few hours the pain and disagreeable symptoms are relieved, and two or three doses generally complete the cure. Liquids are not allowed during its operation, as they are apt to induce vomiting.

RHUS TOXICODENRON. *Ed. Lond.*

Willd. *g.* 566, *sp.* 17. *Pentandria Trigynia.*—Nat. ord. *Dumosæ*, Linn., *Terebinthaceæ*, Juss.

Poison oak.

Off.—The leaves.

Folia rhois toxicodendri. *Ed.*
Folia toxicodendri. *Lond.*

This is a deciduous shrub, of moderate growth, a native of North America. The leaves are alternate, and stand upon very long leaf-stalks. Each leaf consists of three leafits. Its juice is milky when it first exudes, but becomes jet black by exposure to the air, and the black varnish of China is from another species. I have a specimen sent from India by the Marquis of Hastings, marked " Poison." The effects of the milky juice of the European species are inert upon some individuals, but very hurtful to others, causing erysipelas of the part touched and nervous symptoms.

Medical use.—It was first tried as a medicine by Dr Alderson of Hull, in imitation of the experiments of M. Fresnoi with the Rhus radicans. He gave it in four cases of paralysis, in doses of half a grain, or a grain three times a-day, and all his patients recovered, to a certain degree, the use of their limbs. The first symptom of amendment was always an unpleasant feeling of prickling or twitching in the paralytic limbs. I have given it in larger doses, without experiencing the same success. It was not, however, inactive. In one case the patient discontinued its use on account of the disagreeable prickling it occasioned ; and in general it operated as a gentle laxative, notwithstanding the torpid state of the bowels of such patients.

Ricinus communis. *Ed. Lond. Dub.*
Willd. *g.* 1720, *sp.* 2. *Monœcia Monadelphia.*—Nat. ord. *Tricoccæ*, Linn., *Euphorbiaceæ*, Juss.

Palma Christi.

Off.—The seeds, and the fixed oil obtained from them, Castor oil.

a) Semina ricini communis. *Ed.*
Semina ricini. *Lond.*
b) Oleum fixum ricini communis. *Ed.*
Oleum ricini, e seminibus expressum. *Lond. Dub.*

This beautiful plant grows in both Indies, Africa, and the south of Europe. In this country it is annual, but in warmer climates it survives several years, and the tall variety grows to 30 or 40 feet. The capsules are prickly and triangular, and contain, under a thin, dry, grey, and black-marbled husk, a white oily kernel. One or two of the seeds swallowed entire operate as a drastic purgative or emetic.

The kernels yield almost a fourth part of their weight of a bland fixed oil, commonly called Castor oil. It is obtained from them either by expression, or by decoction with water. The former method is practised in Europe and the East Indies; the latter in the West Indies. Oil obtained in the latter way is always coloured; in the former it is colourless. The greatest part of the oil of commerce is now brought from the East Indies. When turbid it is easily cleared by filtration through leather or paper. Castor oil is sometimes extremely acrid, and it was supposed at one time that the acrimony was derived from the husks, and at another from the embryo; but it is now established that it is developed by heat being employed to facilitate the extraction of the oil. Boutron-Charlard and Henry found that the *episperm* possessed no acrimony, and that the *embryo* yielded a mild oil, with an agreeable taste resembling green coffee. But the oil obtained from the *perisperm* or *albumen*, when separated from all other parts, becomes acrid, if heat be used in extracting it.

Genuine castor oil is thick and viscid, of a whitish colour, insipid or sweetish to the taste, and without smell, and has the peculiarity of being soluble in alcohol in all proportions.

Medical use.—As a medicine, it is a gentle and useful purgative: it in general produces its effects without griping, and may be given with safety where acrid purgatives are improper, as in cholic, calculus, gonorrhœa, &c.: some likewise use it as a purgative in worm cases. Half an ounce, or an ounce, commonly answers with an adult, and a drachm or two with an infant.

The aversion to swallowing oil is generally considerable. Different modes of overcoming this have been proposed. Some prefer taking it swimming on a glass of water, or peppermint water; others, mixed with coffee, in the form of an emulsion, with mucilage, or with the addition of a little spirits.

Castor oil mixed with gruel is also frequently thrown into the rectum as a purgative clyster; and it has been even injected into the bladder in calculus, to diminish the irritation of the calculus.

ROSA.

Willd. *g*. 997. Smith, *g*. 232. *Icosandria Polygynia.*—Nat. ord. *Senticosæ*, Linn., *Rosaceæ*, sect. *Roseæ*, Juss.

Sp. 16. Willd. ROSA GALLICA. *Ed. Lond. Dub.*
Red rose.

Off.—The petals.

PETALA ROSÆ GALLICÆ. *Ed. Lond.*
PETALA ROSÆ RUBRÆ. *Dub.*

THIS has not the fragrance of the succeeding species; but the beautiful colour of its petals, and their pleasant astringency, have rendered them officinal. It must, however, be remarked, that their odour is increased by drying, while that of the damask rose is almost destroyed. They are kept dried for making gargles.

Sp. 15. Willd. ROSA CENTIFOLIA. *Ed. Lond. Dub.*
Damask rose.

Off.—The petals.

PETALA ROSÆ CENTIFOLIÆ. *Ed. Lond.*
PETALA ROSÆ DAMASCENÆ. *Dub.*

THE native country of this shrub is unknown, but the delightful fragrance of its flowers has rendered it the favourite ornament of every garden. The damask rose is now arranged as a distinct species. But it is highly probable that the petals of all the varieties of the *Rosa centifolia*, or Dutch hundred-leaved rose, as well as other species, are employed indiscriminately for the purpose of distilling rose water.

Sp. 31. Willd.; *sp.* 6. Smith. ROSA CANINA. *Ed. Lond.*
Common dog-rose, wild briar or hep-tree.

Off.—The fruit called Heps.

FRUCTUS ROSÆ CANINÆ. *Ed.*
PULPA ROSÆ CANINÆ; baccarum pulpa expressa. *Lond.*

This shrub is found in hedges throughout Britain, and flowers in June. The pulp of the fruit, besides saccharine matter, contains citric acid, which gives it an acid taste. The seeds, and stiff hairs with which they are surrounded, must be carefully removed from the pulp before it can be used.

ROSMARINUS OFFICINALIS. *Ed. Lond. Dub.*
Willd. *g.* 62, *sp.* 1. *Diandria Monogynia.*— Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

Rosemary.

Off.—The herb and flowers.

CACUMINA RORISMARINI OFFICINALIS. *Ed.*
CACUMINA RORISMARINI. *Lond.*

HERBA RORISMARINI. *Dub.*

ROSEMARY is a perennial shrub, which grows wild in the south of Europe, and is cultivated in our gardens. It has a fragrant smell, and a warm, pungent, bitterish taste, approaching to lavender: the leaves and tender tops are strongest; next to these the cup of the flower: the flowers themselves are considerably the weakest, but most pleasant.

Medical use.—Its virtues depend entirely on its essential oil, which seems to be combined with camphor, not only from its peculiar taste, but from its possessing chemical properties, which depend on the presence of camphor, and from its depositing crystals of camphor when long kept.

RUBIA TINCTORUM. *Ed. Lond. Dub.*

Willd. *g.* 187, *sp.* 1. *Tetrandria Monogynia.*—Nat. ord. *Stellatæ*, Linn., *Rubiaceæ*, Juss.

Madder.

Off.—The root.

RADIX RUBIÆ TINCTORUM. *Ed.*
RADIX RUBIÆ. *Lond. Dub.*

MADDER is perennial, and is cultivated in large quantities in England, from whence the dyers are principally supplied with it. It has been said to grow wild in the south of England, but the *Rubia peregrina* was mistaken for it.

The roots consist of articulated fibres, about the thickness of a quill, which are red throughout, have a weak smell, and a bitterish astringent taste. For the use of the dyers, they are first peeled and dried, then bruised and packed in barrels. Madder possesses the remarkable property of tinging the urine, milk, and bones of animals which are fed with it, of a red colour.

Medical use.—It is said to be useful in the atrophy of children, and some believe in its reputed powers as an emmenagogue.

It is given in substance in doses of half a drachm, several times a-day, or in decoction.

RUMEX.

Willd. *g.* 699. Smith, *g.* 184. *Hexandria Trigynia.*—Nat. ord. *Oleraceæ*, Linn., *Polygoneæ*, Juss.

Sp. 18. Willd.; *sp.* 8. Smith. RUMEX AQUATICUS. *Dub.*
Great water-dock.

Off.—The root.

Radix rumicis aquatici. *Dub.*

This is a perennial and indigenous plant, growing in ditches and by the sides of rivers. It attains the height of five feet, and flowers in July and August. The root is large, and is manifestly astringent. It evidently is the *Herba Britannica* of the ancients, so much celebrated for the cure of scurvy and cutaneous diseases. Even syphilis has been said to yield to an infusion of water-dock in wine and vinegar.

Sp. 31. Willd.; *sp.* 10. Smith. Rumex acetosa. *Ed. Lond.*
Common sorrel.

Off.—The leaves.

Folia rumicis acetosæ. *Ed.*
Acetosæ folia. *Lond.*

Sorrel is a perennial plant which grows wild in fields and meadows throughout Britain, and flowers in June. The leaves have a pleasant acid taste, without any smell or particular flavour; their medical effects are, to cool, quench thirst, and promote the urinary discharge: a decoction of them in whey affords an useful and agreeable drink in febrile or inflammatory disorders. All these effects are to be ascribed entirely to the super-oxalate of potass which they contain.

Ruta graveolens. *Ed. Lond. Dub.*
Willd. *g.* 927, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Multisiliquæ*, Linn., *Rutaceæ*, Juss.

Rue.

Off.—The herb.

Herba rutæ graveolentis. *Ed.*
Folia rutæ. *Lond. Dub.*

This is a small shrubby plant, a native of the south of Europe, and cultivated in our gardens.

Rue has a strong ungrateful smell, and a bitterish penetrating taste: the leaves, when in full vigour, are extremely acrid, insomuch as to inflame and blister the skin, if much handled. Neumann got from 960 grains of the dried leaves 330 alcoholic extract, and afterwards 290 watery; and inversely, 540 watery and 40 alcoholic. Both primary extracts are bitter and acrid. Rue also contains a volatile oil, which congeals readily, and is obtained in the greatest quantity by distilling the plant with the seed half-ripe.

Medical use.—With regard to its medical virtues, like other remedies of which the active constituent is an essential oil, it is heating and stimulating, and hence it is sometimes serviceable in spasmodic affections and cases of obstructed secretions.

SABINA. *Dub.* See JUNIPERUS.

SACCHARUM OFFICINARUM. *Ed. Lond. Dub.*

Willd. *g.* 122, *sp.* 4. *Triandria Digynia.*—Nat. ord. *Gramina,* Linn. Juss.

Sugar-cane.

Off.—a) Raw or brown sugar.

SACCHARUM. Præparatum e succo expresso. *Lond.*
SACCHARUM NON PURIFICATUM. *Ed.*
SACCHARUM RUBRUM. *Dub.*

b) Double refined sugar.

SACCHARUM PURIFICATUM. *Lond. Dub.*
SACCHARUM PURISSIMUM. *Ed.*

c) Molasses.

SACCHARI RUBRI SYRUPUS. (Molasses.) *Dub.*
SYRUPUS EMPYREUMATICUS. *Ed.*

SUGAR is a hard but brittle substance, of a white colour, disposed to form semi-transparent crystallizations, of a sweet taste, and without smell. When heated sufficiently it melts, is decomposed, emits a peculiar smell (caromel,) and becomes inflamed. Sugar at 40° is soluble in its own weight of water, and is still less at 212°. It is also soluble in about four parts of boiling alcohol. It combines with volatile oils, and renders them miscible with water. It also unites with potass and lime. It is decomposed by the concentrated sulphuric and nitric acids.

The sugar-cane grows wild in both Indies, and forms the chief object of cultivation in the West Indies.

Sugar is principally obtained from this plant, by boiling down its expressed juice, with the addition of a certain proportion of lime or potashes, until the greater part is disposed to concrete into brownish or yellowish crystalline grains. The lime or potass is added to saturate some malic acid, whose presence impedes the crystallization. The *molasses* is that portion of the inspissated juice which does not crystalize. 1. The crystallized portion, or *raw sugar*, is sent to Europe to be refined. This used to be performed by dis- olving it in water, boiling the solution with lime water, cla- ifying it with serum, or white of eggs, and straining it hrough woollen bags. The solution, after due evaporation, vas permitted to cool to a certain degree, and then poured nto conical forms of unglazed earthen ware, where it con- reted into a mass of irregular crystals. The coloured syrup r molasses which had not crystallized run off through a ole in the apex of the cone. The upper or broad end of he cone was then covered with moist clay, the water of which radually penetrated into the sugar, and displaced a quantity f syrup, which would otherwise have been retained in it, nd have discoloured it. It was then carefully dried, and ot the name of *Loaf* or *Lump sugar*. When the solution and ther steps of the process were repeated, the sugar was said) be *Double refined.*

Sugar is now generally refined by what is called the pa- ent process, which consists in first washing the raw sugar ith a very little water; dissolving it in water heated by eans of steam, fining it with alum saturated by quicklime, ltering it rapidly in a particular apparatus; boiling it down *vacuo;* setting it to granulate at 150°; and, lastly, pour- g it into moulds, and washing out the liquid syrup by satu- ated syrup as formerly. By this process there is much less mpyreumatic syrup formed, and even a considerable quan- ty of sugar can be obtained from the molasses imported om abroad.

Sugar is sometimes made to assume a more regular form crystallization, by carrying the evaporation only a certain ngth, and then permitting the syrup to cool slowly; but e addition of alcohol is necessary to make it crystallize, herwise it forms *Barley sugar*. In this form it is called *rown* or *White sugar-candy*, according to the degree of its urity.

Raw sugar varies very much in quality. It should be dry, ystallized in large sparkling hard grains, of a whitish or ear yellow colour, without smell, and of a strong sweet taste, ithout any peculiar flavour.

Refined sugar should have a brilliant white colour, and a ose compact texture. It should be very hard but brittle, d break with sharp, semi-transparent, splintery fragments; d as it has been lately adulterated with sea salt, it should ave a pure sweet taste, in no degree salt, and should dis- lve entirely in spirits.

Medical use.—Sugar, from being a luxury, has now become one of the necessaries of life. In Europe, it is used almost solely as a condiment. But it is also a very wholesome and powerful article of nourishment; for during crop time, the negroes in the West Indies, notwithstanding their increased labour, always grow fat. It is in this way also that its internal employment is useful in some diseases, as in sea scurvy. The coarse and impure kinds are slightly purgative. Sugar has been lately recommended as the antidote of verdegris. Applied externally it acts as an escharotic on spongy and unhealthy granulations; and to abraded or inflamed surfaces it proves gently stimulant. In pharmacy it is principally employed to cover bad tastes, to give form to, and to preserve more active substances. In using it for the last purpose, we must always remember, that if the proportion of sugar employed be too small, it will promote, instead of retarding the fermentation of the articles it is intended to preserve.

Molasses or treacle is a very impure syrup. It is thick, viscid, of a dark brown, almost black colour, and has a peculiar smell, and a sweet, somewhat acid and empyreumatic taste. It is deteriorated by dilution, especially with sea water, by accident or design. Treacle is applied to many domestic and economical purposes. It is admirably adapted for covering the taste of nauseous drugs; and in hospital practice may supersede the use of sugar in many instances.

SAGAPENUM. *Dub.* Plantæ nondum descriptæ *Gummi-resina. Ed. Lond.*

Sagapenum. A gum-resin.

THE plant which furnishes the substance is not ascertained, but is conjectured by Willdenow to be the Ferula Persica.

Sagapenum is a concrete juice, brought from Alexandria, either in distinct tears, or agglutinated in large masses. It is outwardly of a yellowish colour; internally somewhat paler, and clear like horn; it grows soft upon being handled, and sticks to the fingers; its taste is hot, nauseous, and bitterish, and its smell disagreeable and alliaceous.

Neumann got from 480 grains, 306 alcoholic and 108 watery extract; and inversely, 170 watery, and 241 alcoholic extract. The alcohol distilled from it was sensibly impregnated with its flavour, and along with the water a considerable portion of volatile oil arose. It is not fusible.

Medical use.—In medical virtues it holds a kind of middle place between assafœtida and galbanum, and may be employed in the same manner, and under similar circumstances.

SAL AMMONIACUM. *Dub.* See AMMONIÆ MURIAS.

SAL COMMUNE. *Dub.* See SODÆ MURIAS.

SALIX.
Willd. *g.* 1756.; Smith, *g.* 409. *Diœcia Diandria.*—Nat. ord. *Amentaceæ*, Linn., *Salicineæ*, Juss.

Sp. 10. Willd.; *sp.* 17. Smith. SALIX FRAGILIS. *Dub.*
Crack willow.
CORTEX SALICIS FRAGILIS. *Dub.*

Sp. 33. Willd.; *sp.* 45. Smith. SALIX ALBA. *Dub.*
Common white willow.
CORTEX SALICIS. *Dub.*

Sp. 101. Willd.; *sp.* 40. Smith. SALIX CAPREA. *Lond.*
Great roundleaved sallow.

Off.—The bark.

CORTEX SALICIS. *Lond.*
CORTEX SALICIS CAPREÆ. *Ed.*

THE bark of these, as well as of other indigenous species of willow, have been recommended as substitutes for cinchona. The white willow was first introduced into practice by Mr Stone; and strong evidence in favour of the use of the broadleaved, in debility, intermittents and foul ulcers, has been published by Messrs James, White and Wilkinson. They possess very considerable astringency and bitterness, but are destitute of the active principles of cinchona. Willow bark is given in decoction. An ounce and a half of the dried bark should be first macerated six hours in two pounds of water, and then made to boil in it for ten or fifteen minutes. An ounce or two of this decoction may be given three or four times a-day, or oftener.

SALVIA OFFICINALIS. *Ed. Dub.*
Willd. *g.* 63, *sp.* 7. *Diandria Monogynia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

Sage.

Off.—The leaves.

FOLIA SALVIÆ OFFICINALIS. *Ed.*
SALVIA. *Dub.*

SAGE is a perennial plant, a native of the south of Europe, and cultivated in our gardens. There are several varieties of it, differing in size, or in the colour of the flower, but their properties are the same. They have a peculiar aromatic smell, and a warm aromatic taste, with some degree of bitterness and astringency.

Medical use.—In its effects, sage agrees with other aromatics. It is stimulant, carminative, and tonic. The best preparation for these purposes is an infusion of the dried leaves, drunk as tea. With the addition of a little lemon-juice, it proves an useful diluting drink in febrile disorders, being sufficiently agreeable to the palate.

SAMBUCUS NIGRA. *Ed.*

Willd. *g.* 569, *sp.* 3.; Smith, *g.* 157, *sp.* 2. *Pentandria Trigynia.*—Nat. ord. *Dumosæ,* Linn., *Caprifoliaceæ,* Juss.

Common elder.

Off.—a) The flowers.
FLORES SAMBUCI NIGRI. *Ed.*
FLORES SAMBUCI. *Lond. Dub.*
b) The berries.
BACCÆ SAMBUCI NIGRI. *Ed.*
BACCÆ SAMBUCI. *Dub.*
c) The inner bark.
CORTEX SAMBUCI NIGRI. *Ed.*
CORTEX INTERIOR SAMBUCI. *Dub.*

THIS tree is frequent in hedges: it flowers in June, and ripens its fruit in September. The berries contain malic acid, and have a sweetish, not unpleasant taste; nevertheless, eaten in substance, they offend the stomach. For the market, they are gathered indiscriminately from the Sambucus nigra and Ebulus, a very venial fraud, as their effects are exactly the same. They are, however, easily distinguished, by the latter, when bruised, staining the fingers of a red colour, and the former of the colour of a withered leaf.

Medical use.—An infusion of the inner green bark of the trunk in wine, or the expressed juice of the berries in the dose of half an ounce or an ounce, is said to purge moderately, and in small doses to prove an efficacious deobstruent. The expressed juice of the berries, inspissated to the consistence of a rob, proves an useful aperient medicine, and, if continued for a sufficient length of time, is of considerable service in various chronical disorders. The young leaf-buds are strongly purgative, and act with so much violence as to be accounted unsafe. The flowers have an agreeable aromatic flavour like that of frontignac wine, which they yield in distillation to water, and impart, by infusion, to vinous and spiritous liquors and oils.

SANTALUM RUBRUM. *Dub.* See PTEROCARPUS.

SANTONICUM. *Dub.* See ARTEMISIA.

SAPO.

a) Hard soap, composed of soda and olive oil.

SAPO: Sapo albus Hispanus, ex oleo Oleæ Europæ et soda confectus. *Ed.*

SAPO DURUS: Sapo ex Olivæ oleo et soda confectus (Hispanicus.) *Lond.*

SAPO: Durus Hispanicus. *Dub.*

b) Soft soap made of oil and potass.

SAPO MOLLIS: Sapo ex oleo et potassa confectus. *Lond. Ed.*

SOAPS are combinations of the fluid or concrete fixed oils with alkalies, earths or metallic oxides.

The true theory of saponification has been explained by Chevreul. We have already stated, that oils and fats consist of two substances, elain and stearin, in various proportions. These substances, when they are subjected to the action of alkaline substances, are converted into acids, which are called *Oleic* and *Margaric*, and soaps are, in fact, a mixture of the oleate and margarate of the alkali employed. The characteristic properties of these acids are:

Margaric acid is solid, and of a pearl white colour, insipid, weak smell like that of white wax, lighter than water, and does not redden tincture of turnsole until it be softened by heat; at 134 Fahr. it melts into a colourless very limpid liquid, which crystallizes on cooling into brilliant crystals of the purest white. It is partly volatilized, and partly decomposed by heat.

Oleic acid is a pale yellow fluid, with a rancid smell and taste; sp. gr. 0.898; reddens infusion of litmus; insoluble in water, and very soluble in alcohol; below 43 Fahr. it concretes into white acicular crystals.

One variety of each of the alkaline soaps is officinal; soft soap made with potass, hard soap with soda, and the volatile liniment is an ammoniacal soap: but for each kind of soap, certain oils are preferable.

Soft soap is a transparent brown gelatinous mass, with opaque white spots interspersed through it. When perfect it is neutral. From an excess of alkali it is deliquescent. When cloudy it denotes the presence of soda or lime. In this country soft soap is made with fish oil. It may also be made with linseed oil; and nut oil yields it of very good quality. The white spots are said to be owing to an admixture of tallow. Dr Ure found good Glasgow soft soap to consist of potash 9., oily matter 43.7, and water 47.3 = 100. In medicine it is only used as a detergent and cataplasm; but some apothecaries improperly substitute it for Castile soap in the preparation of anodyne balsam.

Hard soap is of many qualities, but they may be generally divided into white, mottled, and brown soap. In this country white soap is made with tallow; and brown soap with a mixture of tallow, rosin, and a little palm oil. Mottled soap is made of the same materials as white soap, but differently treated, so as to retain the alumino-ferrugineous soap, which is always formed, but separated in the manufacture of white soap. Mottled soap is always harder, and cannot contain above 16 *per cent.* of water, whereas the appearance of white soap is improved by an excess of water, which is never less than 33 *per cent.* Transparent soap may be made by dissolving white soap in boiling alcohol: On cooling it forms a clear jelly, and dries transparent like amber.

The officinal species of hard soap is composed of olive oil and soda. It is only prepared in the countries which produce the oil. For medicinal use we prefer the Spanish. It should be white and hard, dissolve entirely in water and in alcohol, forming with the former a milky, and with the latter a transparent solution: and the solutions should froth freely on agitation. It should not feel greasy or moist, or be covered with a saline efflorescence; and the solution should not have a rancid smell or taste. The mottling is an impurity. Some of the foreign Dispensatories are so very particular about the nature of the soap used in medicine, as to direct it to be prepared by the apothecary, by simply triturating, without the assistance of heat, Provence oil, with half its weight of a solution of soda, of the specific gravity of 1.375 until they unite.

Various kinds of soap have been analysed by able chemists. The results are,

	Soda.	*Oily matter.*	*Water.*
Castile,	9.	76.5	14.5
London imitation,	10.5	75.2	14.3
French cakes,	4.6	50.2	45.2
Marseilles,	6.	60.	34.
Glasgow best white,	6.4	60.	33.6
Berry's white,	8.	75.	17.
Glasgow brown,	6.5	70.	23.5

Soap is decomposed by all the acids, earths, and earthy and metalline salts. The acids combine with the alkali, and separate the oil. The earths form an insoluble earthy soap with the oil, and separate the alkali; while with the salts there is a mutual decomposition, their acid combines with the alkali, and earthy or metalline soaps are formed. The earthy soaps are insoluble in water. The metallic soaps are also insoluble in water; many of them are soluble in oil, and some of them in alcohol.

Med. use.—The detergent property of soap, or the power it possesses of rendering oily and resinous substances miscible with water, has given rise to very erroneous notions of its medical virtues. It was supposed to render such substances more readily soluble in the juices of the stomach, and in the fluids of the body, and to be well fitted for dissolving such oily or unctuous matters as it may meet with in the body, attenuating viscid juices, opening obstructions of the viscera, and deterging all the vessels it passes through. It has likewise been supposed a powerful menstruum for urinary calculi; and a solution of soap in lime water has been considered as one of the strongest solvents that can be taken with safety into the stomach; for the virtue of this composition has been thought considerably greater than the aggregate of the dissolving powers of the soap and lime-water when unmixed.

How erroneous these ideas are, appears evidently, when we recollect the very easy decomposition of soap, which renders it perfectly impossible that it should enter the circulating system, or indeed come into contact with the fluids even of the mouth, without being decomposed. As to the solution of soap in lime-water, we may observe, that it is only a clumsy way of exhibiting a solution of soda; for the soap is decomposed, an insoluble soap of lime is formed, and the soda remains in solution. The internal use of soap should therefore be confined, in our opinion, to the giving form to other substances which are not decomposed by it, and to the decomposing metallic poisons when they have been taken into the stomach. For this last purpose, a teacupful of a solution of soap in four times its weight of water may be drunk every three or four minutes, until a sufficient quantity be taken.

Applied externally, soap is a very powerful detergent, and combines the stimulating properties of the alkali with the lubricity of the oil. In this way it often proves a powerful discutient, and a useful application to sprains and bruises.

SARSAPARILLA. *Lond. Dub.* See SMILAX.

SASSAFRAS LIGNUM ET RADIX. *Lond. Dub.* See LAURUS.

SCAMMONEÆ GUMMI RESINA. *Lond. Dub.* See CONVOLVULUS.

SCILLA MARITIMA. *Ed. Lond. Dub.*

Willd. *g.* 640, *sp.* 1. *Hexandria Monogynia.*—Nat. ord. *Liliaceæ*, Linn. Juss.

Squill.

Off.—The root.

RADIX SCILLÆ MARITIMÆ. *Ed.*

RADIX SCILLÆ. *Lond. Dub.*

THE squill is a perennial bulbous-rooted plant, which grows wild on the sandy shores of Spain, Portugal, north of Africa, and the Levant.

The root is about the size of the fist, pear shaped, with the apex upwards, and consists of fleshy scales, attenuated at both edges, surrounded by other scales, which are arid, shining, and so thin, that the root, at first sight, seems to be tunicated. The recent root is full of a white viscid juice, has scarcely any smell, but a very bitter, nauseous, and extremely acrid taste. Rubbed on the skin, it inflames and blisters.

It is commonly met with in the shops in the form of the dried scales, which should be brittle, semi-pellucid, smooth but marked with lines, and when chewed should feel tenacious, and taste very bitter, without manifest acrimony.

The active constituent of the squill is an acrid principle, now called *Scillitin*, which is volatile, and therefore it becomes almost inert by too much drying, or by being kept too long in the form of powder. It also contains bitter extractive, much mucilage, albumen and starch.

Med. use.—Given internally in large doses, it produces purging and vomiting, sometimes even strangury, bloody urine, inflammation and erosion of the stomach. In smaller doses, it proves a useful expectorant and diuretic, but it is apt to produce heat and general excitement.

Squill is sometimes given as a general stimulant in typhus, especially to cattle. But it is much more frequently exhibited as an expectorant, where the lungs are loaded with viscid matter, and as a diuretic in dropsical cases, for which purpose it is commonly conjoined with calomel.

The dose of squill is one or two grains three or four times a-day; and the most commodious form of its exhibition, unless when designed as an emetic, is that of a bolus or pill: in a liquid form it is to most people offensive, though often employed dissolved in spirit or vinegar.

SCROPHULARIA NODOSA. *Dub.*

Willd. *g.* 1152, *sp.* 2.; Smith, *g.* 285, *sp.* 1. *Didynamia Angiospermia.*—Nat. ord. *Personatæ*, Linn., *Scrophulariæ*, Juss.

Knotty-rooted figwort.

Off.—The herb.

HERBA SCROPHULARIÆ. *Dub.*

THIS is a perennial plant, growing in woods and under hedges. It flowers in July. The roots are grey and knotty, and have a nauseous smell, and a sweet but somewhat acrid taste, both of which they partly lose by drying.

SENEGÆ RADIX. See POLYGALA.

SENNÆ FOLIA. *Lond. Dub.* See CASSIA.

SERPENTARIÆ RADIX. *Lond. Dub.* See ARISTOLOCHIA.

SEVUM. *Lond. Dub.* See OVIS.

SIMAROUBÆ CORTEX. *Lond. Dub.* See QUASSIA.

SINAPIS.

Willd. *g.* 1246. Smith, *g.* 312. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ*, Linn., *Cruciferæ*, sect. *Sisymbriæ*, Juss.

Sp. 4. Willd.; *sp.* 2. Smith. SINAPIS ALBA. *Ed. Dub.*
White mustard.
Off.—The seeds.
SEMINA SINAPIS ALBÆ. *Ed.*
SEMINA SINAPEOS. *Dub.*

Sp. 5. Willd.; *sp.* 3. Smith. SINAPIS NIGRA. *Lond.*
Common mustard.
Off.—The seeds.
SEMINA SINAPIS. *Lond.*

THESE plants are both annual, both grow wild in England, and possess similar virtues.

They flower in June, and produce small round compressed seeds, which have an acrid bitterish taste, and a pungent smell when reduced to powder. The common mustard has blackish seeds, and is more pungent than the white.

They impart their taste and smell to water, whilst rectified spirit extracts extremely little of either: the whole of the pungency arises with water in distillation. Committed to the press, they yield a considerable quantity of a bland insipid oil, perfectly void of acrimony: the cake left after the expression is more pungent than the mustard itself.

Medical use.—Mustard seed is swallowed entire, to the quantity of a table spoonful or more, to stimulate the stomach in some cases of dyspepsia, and to excite the peristaltic motion of the intestines, especially when they are torpid, as in paralysis. The powder made into a paste with water is commonly used as a condiment with animal food: infused in water, it proves emetic when taken in considerable doses, and in smaller ones acts as a diuretic and aperient; but it is more frequently applied externally as a topical stimulus, made into a paste, or sinapism, with vinegar and bread-crumb.

SISYMBRIUM NASTURTIUM. *Ed.*

Willd. *g.* 1238, *sp.* 1.; Smith, *g.* 306, *sp.* 1. *Tetradynamia Siliquosa.*—Nat. ord. *Siliquosæ*, Linn., *Cruciferæ*, sect. *Sisymbriæ*, Juss.

Common water-cress.
Off.—The recent herb.
HERBA.

THIS plant is perennial, and grows wild in clear springs and rivulets in every part of Britain. Its leaves remain gre all the year, but are in greatest perfection in the spring. They have a pungent smell (when rubbed betwixt the fingers,) and an acrid taste, similar to that of scurvy grass, but weaker. By drying or boiling, they lose their sensible qualities entirely.

Medical use.—It acts as a gentle stimulant and diuretic; for these purposes, the expressed juice, which contains the peculiar taste and pungency of the herb, may be taken in doses of an ounce or two, and continued for a considerable time.

SIUM NODIFLORUM. *Dub.*

Willd. *g.* 544, *sp.* 4.; Smith, *g.* 139, *sp.* 3. *Pentandria Digynia.*—Nat. ord. *Umbellatæ,* Linn. Juss.

Procumbent water parsnip.

Officinal.—The herb.

HERBA SII. *Dub.*

THIS plant is perennial, and grows wild in rivers and ditches in England. It flowers in July and August, and was formerly alleged to be not only diuretic, but also emmenagogue and lithontriptic. It is now scarcely employed.

SMILAX SARSAPARILLA. *Ed. Dub. Lond.*

Willd. *g.* 1800, *sp.* 9. *Diœcia Hexandria.*—Nat. ord. *Sarmentaceæ,* Linn., *Asparargineæ,* Juss.

Sarsaparilla.

Off.—The root.

RADIX SMILACIS SARSAPARILLÆ. *Ed.*

RADIX SARSAPARILLÆ. *Lond. Dub.*

SARSAPARILLA is the product of tropical America, on both sides of the line. There are different varieties in commerce, which are named from some places connected with their importation or exportation. The Lisbon is the growth of the Brazils. Honduras and Vera Cruz export other varieties; and the Jamaica does not grow in that island, but is brought to it from Carthagena, and is the produce of Colombia. There is some uncertainty as to the botanical species furnishing it. The *Smilax sarsaparilla* of Willdenow is indigenous in Virginia, but none of the medicinal root is furnished by it; the *glauca,* which yields the Brazil root, is a variety of this species. Willdenow, upon the authority of Humboldt and Bonpland, says that the medical root of Honduras and other parts of the Spanish Main is that of the *syphilitica,* or rather of a species separated from it by Kunth, and called *officinalis.*

Sarsaparilla root is about the thickness of a goose quill, and several feet in length, with pencils of radicles at short distances. The main root runs horizontally, at a very little depth from the surface, and is easily pulled up by means of rakes. Its cuticle is brown, with longitudinal plaits, and easily separated; the cortical part is white, grey or reddish, and of considerable thickness; the wood and pith are white, the latter thick in proportion to the former. They have a glutinous, bitterish, not ungrateful taste, and no smell.

The virtues reside entirely in the cortical part, and are entirely extracted by water even cold. Mr Pope has given a comparative table of its action. The Jamaica contained the greatest quantity of soluble matter; the Lisbon the least, and the bark of the Jamaica five times as much as the wood.

Medical use.—It was first brought into Europe by the Spaniards, about the year 1563, with the character of being a specific for the cure of the lues venerea, a disease which made its appearance a little before that time, and likewise of several obstinate chronic disorders. It then lost its reputation, and was considered by many as a very inert mucilaginous substance; and the diaphoresis, which it is sometimes supposed to produce, was entirely ascribed to warm and diluent regimen employed at the same time. More recently, however, it has come into favour for the cure of many cutaneous affections, and especially of what are called syphiloid diseases; and if upon just grounds, it will explain why it should have been so strongly recommended in syphilis, and why it should have failed to retain its reputation.

Soda impura. Subcarbonas sodæ impura. *Lond.*
Carbonas sodæ impurus, v. s. Barilla. *Ed.*
Barilla, s. s. Soda impura. *Dub.*
Impure carbonate of soda. Barilla. Fixed mineral alkali.

Soda is a very common mineral production. It is the basis of sea-salt; and combined with carbonic acid, it is found on the surface of the earth in Egypt, Syria, Barbary, Hungary, &c. and is obtained by the incineration of marine vegetables, especially the salsola soda and kali, the salicornia herbacea, &c. The Spaniards even cultivate these in salt marshes for the sake of the soda. After being cut down, they are dried like hay. A deep pit is then prepared, and a bundle or two of the dried vegetables set on fire are thrown into it. After being well kindled, other bundles are thrown in until the pit is filled. When the incineration is completed, the barilla is found in the bottom, caked into a solid mass, which is worked like a stony substance. Good barilla is firm, hard, heavy, dry, sonorous, spongy, and internally of a blue colour mixed with white spots, does not deliquesce, emits no unpleasant smell on solution, and does not leave a large proportion of insoluble matter. Incinerated soda is mixed with potash, muriate of soda, and other saline matters; mineral soda with clay and other earthy substances. The Egyptian soda was reckoned the best, then the Spanish (barilla,) afterwards the Carthaginian, and that prepared from different species of fuci (kelp) is the worst.

" But all these carbonated sodas are inferior in purity to those now manufactured in Britain, by decomposing the sulphate of soda, or the mixed salts known in commerce by the name of Soapers salts. The soapers salts remain, after kelp has been subjected by the manufacturer of hard soap to the process for separating carbonate of soda. They consist almost entirely of a mixture of the muriates and sulphates of soda and potash, with a little animal matter, and a small quantity of the carbonate of soda which has escaped separation.

When sulphate of soda is employed, it is generally decomposed in the following manner. About 5 cwt. of sulphate of soda, 2 cwt. of saw-dust, 50 lbs. of lime, and a small quantity of iron-filings, or borings, are ground together, and the mixture is exposed in a reverberatory furnace until it becomes pasty. By this process the carbon of the saw-dust combines with the oxygen of the sulphuric acid, and forms carbonic acid, while the sulphur of the sulphuric acid is in part sublimed, and the rest combines with the lime and iron and forms sulphurets. The mixture is then transferred from the furnace into large cisterns with double bottoms, and lixiviated to separate the sulphurets and other impurities. The ley is afterwards evaporated to dryness; but as the dry mass which is formed still contains a little sulphate of soda, the whole of the preceding process is repeated to decompose the remainder of that salt. It is obvious that the strong heat which is necessary to destroy the sulphuric acid will prevent the soda from combining with a sufficient quantity of carbonic acid to constitute a carbonate. The dry mass which remains after the evaporation of the second ley is therefore put into a reverberatory calcining furnace, with a quantity of saw-dust or any carbonaceous matter, and exposed to a heat sufficient to convert the carbon into carbonic acid, and to allow that acid to unite in its proper proportion with the soda. This process completes the formation of the carbonate of soda, which is now withdrawn from the furnace and lixiviated, after which the solution is crystallized in a temperature which should not exceed 55°. If the temperature be higher crystals will not form.

As soapers salts are principally a mixture of sulphates and muriates, it is evident, that when soda is procured from them, part of the process will be intended to decompose the sulphates, and part the muriates. That which relates to the sulphates has been already explained; and that which relates to the muriates will be best understood by describing the decomposition of the unmixed muriate of soda. Soda may be procured from this salt, but in the present state of the market not with so much advantage as from sulphate of soda or soapers salts. When muriate of soda is employed, the following process is followed.

Saturated solutions of equal quantities of the muriate of soda, and the pot or pearl ashes of commerce, are mixed together, and then boiled for a short time till a pellicle appears on the surface of the liquid. It is then watched with great care till it shews signs of salting. The solution is now run into a cooler, to allow the muriate of potash to crystallize; and when the whole of this salt has separated, the supernatant liquid which contains soda in a somewhat caustic state is evaporated to dryness. The potash employed in the manufacture of soda is rather caustic, owing to the heat employed in its preparation having deprived it of a portion of acid: hence, when solutions of this salt and of the muriate of soda are mixed, the carbonate of soda which is produced is deficient in carbonic acid. The dry mass is therefore mixed with a quantity of saw-dust, and exposed to a low red heat in a reverberatory calcining furnace, till it combines with a sufficient quantity of carbonic acid. It is then withdrawn from the furnace, and lixiviated, and the solution crystallized in a temperature which should not exceed 50° or 55°.

In the manufacture of soda from soapers salts, the muriate of potash is the only salt which remains unchanged; the sulphate and muriate of soda and the sulphate of potash are decomposed. The process which destroys the sulphuric acid of the sulphate of soda, and converts that salt into a carbonate of soda, produces a similar change on the sulphate of potash, converting it into a carbonate of potash, which immediately acts on the muriate of soda that happens to be present, disengaging its alkali, which thus augments the desired product. The heat to which the soapers salts are exposed, destroys the animal matter they contain.

Soda is sometimes prepared by decomposing its muriate by litharge or subcarbonate of lead, or by decomposing its sulphate by acetate of lime. The acetic acid, for this purpose, is obtained by distillation from wood during its conversion into charcoal.

Carbonate of soda is an article of the greatest importance in many manufactures."

For the preceding account of the manufacture of soda, I am indebted to Mr Steele, Lecturer on Chemistry at Paisley and Glasgow.

Med. use.—Carbonate of soda is now much used in medicine. Its primary effect is to correct acidity in the *primæ viæ.* It also acts as a tonic, and in many instances gives great relief in calculous complaints, although there can be little reliance placed upon it as a lithontriptic. Being an efflorescent salt it is conveniently given in the form of powder, or made up into pills.

SODÆ BORAS; s. s. Sub-boras sodæ. *Lond.*
BORAS SODÆ; v. s. Borax. *Ed.*
BORAX; s. s. Sub-boras sodæ. *Dub.*

Borate of soda. Sub-borate of soda. Borax.

BORAX is found only in Thibet and Persia. It is extracted from the waters of some wells and lakes by evaporation. In its impure state it is called *Tincal,* and is brought from the East Indies in great masses, composed of a few large crystals, but chiefly of smaller ones, partly white and partly green, joined together as it were by a greasy yellow substance, intermixed with sand, small stones, and other impurities. By repeated solutions, filtrations and crystallizations, it shoots into hexangular prisms of a white colour, a styptic and alkaline taste, colouring vegetable blues green, soluble in eighteen parts of water at 60°, and in six at 212°, slightly efflorescing in the air, and when heated, swelling, and with the loss of nearly half its weight, forming a porous friable mass, which in a greater heat melts into a transparent glass soluble in water. Besides the acids and alkalies, which have a greater affinity for its acid or basis than these have for each other, it is decomposed by the sulphates, muriates, nitrates, phosphates, and fluates, of all the earths, and of ammonia. It consists of 6 boracic acid, 4 soda, and 9 water. From its evidently alkaline properties it has been considered a *sub-borate;* but Dr Thomson, having estimated the proportional of boracic acid to be 3., considers it as a *biborate.* Borax has the singular property of forming a quadruple salt with cream of tartar, which is exceedingly soluble and not crystallizable, but by evaporation is converted into a viscid fluid like thick syrup, and lastly into a homogeneous transparent gummy mass. The Prussian Pharmacopœia fixes the proportions at one of borax to three of cream of tartar. According to the atomic doctrine, they should be 19 borax and 24.75 tartar. It used to be called *Soluble cream of tartar*, and furnishes a means of giving large doses of that insoluble salt in solution.

Med. use.—The medical virtues of borax have not been sufficiently ascertained by experience: it is supposed to be, in doses of half a drachm or two scruples, diuretic and emmenagogue. Mr Bisset recommends a solution of the salt in water, as the most powerful dissolvent yet known, of aphthous crusts in the mouth and fauces of children. And for the same purpose, it is often applied, in the form of powder, mixed up with sugar.

Murias sodæ. *Ed.*
Sodæ murias, s. s. Murias sodæ. *Lond.*
Sal commune, s. s. Murias sodæ. *Dub.*
Muriate of soda. Common sea-salt.

This is the most common of all the neutral salts. It is not only found in immense masses on and under the surface of the earth, and contained in great quantities in many salt springs, but it is the cause of the saltness of the sea.

There are two varieties of native muriate of soda, the lamellar and fibrous. It is found in Poland, Hungary, Spain, England, &c. When necessary, it is purified by solution and crystallization.

Salt springs occur in many parts of the world. The quantity of muriate of soda contained in these varies from an inconsiderable quantity even up to one-third.

Sea-water also varies much in strength. It is said to contain most salt in warm climates, and at great depths. According to Dr Murray's accurate analysis, sea-water in the Frith of Forth contains in a pint, soda 96.3; magnesia 14.8; lime 2.9; muriatic acid 97.7; sulphuric acid 14.4=226.1.

Muriate of soda, is obtained from its natural solutions by evaporation and crystallization, is commonly mixed with earthy muriates, which, being deliquescent salts, dispose it to attract moisture from the atmosphere. It may, however, be purified by precipitating the earths by means of carbonate of soda, or by washing the crystallized salt with a saturated solution of muriate of soda, heated to ebullition. In this state it is not capable of dissolving any more muriate of soda, but will dissolve a considerable quantity of the earthy muriates.

There are two doctrines concerning the constitution of sea salt; the older considers it as composed of muriatic acid 4.625 and 4. soda =8.625; the newer, that of Sir H. Davy, of chlorine 4.5 and sodium 3=7.5, in whose nomenclature it is therefore called *Chloride of sodium;* the French call it *Clorure* or *Chloruret of sodium.* But even according to this doctrine it becomes muriate of soda as soon as it comes in contact with water; the chlorine being acidified by the hydrogen, and the sodium oxidized by the oxygen of a proportion of the water.

Muriate of soda has a pure salt taste, is soluble in 2.8 times its weight of water at 60°, and in 2.76 at 212°. It is not soluble in alcohol. By the action of heat it first decrepitates, then melts, and lastly sublimes without decomposition. The primitive form of its crystals is cubic, and they are permanent in the atmosphere. It is decomposed by the sulphuric and nitric acids, by potass and baryta, by secondary salts containing these, and by metalline salts whose base forms an insoluble compound with muriatic acid: it is also gradually decomposed by lime, iron, and litharge.

Medical use.—Muriate of soda is one of the most important articles in the arts, and in domestic economy. As a medicine, it is useful in some cases of dyspepsia; and in large doses it is said to check vomiting of blood. It is a common ingredient in stimulating clysters, and is sometimes applied externally, as a fomentation to bruises, or in the form of bath, as a gentle stimulus to the whole surface of the body.

SODÆ SULPHAS; S. S. Sulphas sodæ. *Lond.*
Sulphate of soda.

WHAT has been said of the sulphate of potass is applicable also to this salt, which is now for the first time introduced into the Materia Medica by the London College, while a formula is given by all the Colleges for its preparation.

SOLANUM DULCAMARA. *Lond. Dub.*

Willd. *g.* 383, *sp.* 15.; Smith, *g.* 100, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Solanaceæ*, Linn. Juss.

Bitter-sweet. Woody nightshade.

Off.—The twigs.

CAULIS SOLANI DULCAMARÆ. *Ed.*
DULCAMARÆ CAULIS. *Lond.*
DULCAMARA; stipites autumno collecti. *Dub.*

THIS climbing shrub grows wild in moist hedges, has woody brittle stalks, and flowers in June and July. The twigs should be gathered in autumn after the fall of the leaf. The taste, as the name of the plant expresses, is both bitter and sweet; the bitterness being first perceived, and the sweetness afterwards; and when fresh they have a nauseous smell.

Medical use.—The dulcamara was formerly much esteemed. It is in general said to excite the heart and arteries, to increase all the secretions and excretions, and in large doses to produce nausea, vomiting, and convulsions; but its effects are seldom obvious. It has been recommended in cutaneous affections, especially lepra, and in syphiloid diseases, in rheumatic and cachectic swellings, in ill-conditioned ulcers, scrofula, indurations from milk, leucorrhœa, jaundice, and obstructed menstruation. It has principally been used in decoction as a diet drink: two or three ounces of that of the London Pharmacopœia may be given thrice a-day, and gradually augmented, till a pint be consumed daily. A stronger decoction may be used externally as a lotion. In the form of extract, from 5 to 10 grains may be given for a dose.

SOLIDAGO VIRGA AUREA. *Dub.*

Willd. *g.* 1483, *sp.* 35.; Smith, *g.* 368, *sp.* 1. *Syngenesia superflua.*—Nat. ord. *Compositæ radiatæ*, Linn., *Synantheræ*, sect. *Corymbiferæ*, Juss.

Common golden-rod.

Officinal.—The flowers and leaves.

a) FLORES VIRGÆ AUREÆ. *Dub.*
b) FOLIA VIRGÆ AUREÆ. *Dub.*

THIS plant is perennial, and is found wild on heaths and in woods, producing panicles of yellow flowers from July to September. The leaves have a moderately astringent bitter taste; and thence prove serviceable in debility and laxity of the viscera, and disorders proceeding from that cause.

SPARTIUM SCOPARIUM. *Ed. Dub. Lond.*

Willd. *g.* 1332, *sp.* 19.; Smith, *g.* 321, *sp.* 1. *Diadelphia Decandria.*—Nat. ord. *Papilionaceæ*, Linn., *Leguminosæ*, sect. *Papilionaceæ*, Juss.

Common broom.

Off.—The tops and seeds.

a) SUMMITATES SPARTII SCOPARII. *Ed.*
CACUMINA SPARTII. *Lond.*
CACUMINA GENISTÆ. *Dub.*
b) SEMINA GENISTÆ. *Dub.*

THIS is a very common shrub on dry pastures, flowering in June and July.

The leaves have a very bitter taste, and when given in decoction prove considerably diuretic. The seeds have similar properties.

SPERMACETI; ex Physetere macrocephalo. *Ed.*
CETACEUM; concretum sui generis. *Lond.*
SPERMA CETI; sevum. *Dub.*
Spermaceti.

THE spermaceti whale is characterized by his enormous head, great part of which is occupied by a triangular cavity of bone, covered only by the common integuments. In the living animal, this cavity is filled with a white, fluid, oily substance, amounting sometimes to many tons in weight. On the death of the whale, it congeals into a white unctuous mass, from which a considerable quantity of very pure whale oil is obtained by expression. The residuum, afterwards freed from impurities, by washing with water, melting, straining, expressing through linen bags, and, lastly, washing in a weak ley of potass, is the peculiar substance well known by the name of *Spermaceti*, for which, probably on account of its conveying an incorrect idea of the nature of the substance, the London College has substituted *Cetaceum*. It is also contained in solution in the common whale and other fish oils; for it is often found deposited, by crystallization, in the reservoirs containing them.

Spermaceti, *cetine*, may be obtained crystallized in white argentine plates, of an unctuous feel and taste, and a vapid smell. It melts between 90° and 95°, and at a higher temperature may be sublimed almost unchanged. Its vapour is inflammable, and its flame is bright, clear, and without smell. By exposure to the air it becomes rancid. It is soluble, especially by the assistance of heat, in alcohol and in ether. In its other properties it agrees with the fixed oils, with which it unites very readily by fusion.

As a medicine for internal use, it agrees with the fixed concrete oils; and in the composition of ointments, &c. its place may be very well supplied by a mixture of oil and wax.

SPIGELIA MARILANDICA. *Ed. Lond.*

Willd. *g.* 308, *sp.* 2. *Pentandria Monogynia.*—Nat. ord. *Stellatæ*, Linn., *Gentianeæ*, Juss.

Carolina pink.

Off.—The root.

RADIX SPIGELIÆ MARILANDICÆ. *Ed.*
RADIX SPIGELIÆ. *Lond. Dub.*

THIS plant is perennial, and grows wild in the southern parts of North America. It is the *Unsteetla* of the Cherokees. The root is celebrated as anthelmintic, particularly for the expulsion of lumbrici from the alimentary canal, and it often affords relief where no worms are discharged. Some order it in doses of ten or fifteen grains, while others give it in drachm doses, alleging that the nervous affections it sometimes produces more readily happen from small doses, as the large ones often purge or puke. Some prefer the form o infusion. An emetic is generally premised; and its purgative effect is assisted by some suitable additions. Infused in wine, it has been found useful in intermittents. Dr Barton recommends it in the insidious remitting fever of children which often lays the foundation for hydrocephalus.

SPONGIA OFFICINALIS. *Ed. Dub. Lond.*

Cl. *Zoophyta.* Ord. *Spongia.*

Sponge.

Off.—Sponge.

SPONGIA OFFICINALIS. *Ed.*
SPONGIA. *Lond. Dub.*

SPONGE is principally found in the Mediterranean and Red Seas. It was long supposed to be a vegetable production, bu it is now universally allowed to belong to that remarkable class of animals called Zoophytes, which are negatively characterized by Cuvier, as having no vertebræ, no sanguiferous vessels, no spinal marrow, and no articulated limbs. The sponges belong to that division of the zoophytes, which are attached to a solid trunk, and are particularized by their base being spongy, friable, or fibrous.

Sponge is a soft, light, very porous and compressible substance, absorbing by capillary attraction a large proportion of any fluid in which it is immersed.

Medical use.—From these properties, it is an useful substance in the practice of surgery. When applied to ulcers which are accompanied with a copious discharge, it absorbs the thinner and more acrid fluid, and leaves the ulcers covered with the thicker and blander matter. It is also useful in suppressing hæmorrhagies, when properly applied by compression, by favouring the coagulation of the blood at the mouths of the vessels. It also forms a convenient tent for dilating wounds and fistulous ulcers, especially when prepared by immersing it in melted wax and oil, and keeping it compressed until it cools. On the melting of the cerate by the heat of the part to which it is applied, the sponge gradually expands, and affords an uniform and gently dilating pressure.

IODINE.

In the earlier editions it was stated, that burnt sponge was nothing else than charcoal, mixed with a little muriate of soda and phosphate of lime. This was a mistake; for my friend Dr Fyfe, and Dr Straub of Hofwyl, detected in it *iodine*, which also exists in the unburnt sponge, probably in the state of a hydriodate.

Iodine is of a black-grey colour, and crystallized either in micaceous plates, or broad and brilliant rhomboidal plates, or long octohedrons. Its fracture is lamellated and greasy. It is very friable, and may be reduced to impalpable powder. It destroys vegetable colours, and stains the skin of a deep orange. Its sp. gr. is 4.948. It does not conduct electricity. It melts at 225 F., and boils between 335° and 355°. Its vapour is of a beautiful violet colour, and smells like chlorine, but weaker. Its taste is acrid, hot and durable, and it acts as a poison. Water dissolves a seven millionth part of its weight, and acquires an orange-yellow colour; and when combined with water, it is vaporized along with it at 212°. It is soluble in alcohol and ether.

Iodine combines with combustible bodies, and these compounds are now called *Iodides* or *Iodurets.*

Arnold of Villanova employed burnt sponge with good effect in scrofula; and Dr Russel in the same disease used burnt tangle and fresh tangle poultices, and both have continued to be popular remedies. From the consideration of these facts, Dr Coindet of Geneva was led to anticipitate, that they depended upon the iodine contained in it. He tried iodine in various forms. 1st, A solution of the hydriodate of potass in the proportions of 48 grains *poids de marc* to an ounce of water; 2d, Ioduretted hydriodate of potass, prepared by dissolving 36 grains of the hydriodate of potass and 10 grains of iodine in an ounce of water, the form which he preferred; 3d, The tincture of iodine got by dissolving 48 grains of iodine in an ounce of alcohol, sp. gr. 0.842. Of either of these he gave ten drops in an ounce of syrup of capillaire and water three times a-day. After a week's use he increased the dose to 15 drops; in another week to 20 drops, by which means, in 8 or 10 weeks, the largest goitres were in most cases dissipated.

The hydriodate of potass is prepared by saturating hydriodic acid with potass, and the hydriodic acid is prepared by passing through iodine suspended in water, or rather its solution in alcohol, a stream of sulphuretted hydrogen gas (hydrothionic acid.)

My friend Dr Turner has improved the method of preparing hydriodate of potass. Into a solution of pure potass he gradually dissolves iodine until the solution acquires a int of brown. By the decomposition of the water, iodate and hydriodate of potass are formed. A stream of sulphuretted hydrogen is now transmitted through it, which converts the iodic acid into hydriodic, and thus the whole iodine is changed into the latter. M. Taddei has proposed to decompose directly a solution of hydrosulphuret of potass by iodine. The products will be sulphate and hydriodate of potass, which may be easily separated.

Medical use.—Iodine, properly administered, is a stimulant, gives tone to the stomach, excites the appetite, and does not act by the intestines, kidneys or skin. It seems to have a specific action upon the uterus, and is one of the most powerful emmenagogues. When given in too large doses, or continued too long, the preparations of iodine cause acceleration of the pulse, palpitation, frequent dry cough, want of sleep, rapid emaciation, loss of strength; with others, only swelling of the legs, or tremblings, or a painful hardness in the goitre, sometimes wasting of the mammæ, remarkable and continued increase of appetite, and in almost all a very rapid diminution, more or less complete, of the goitre during the existence of those symptoms, which are quickly relieved by the suspension of the iodine, and the use of asses milk, cinchona, volatile alkali, opium, and, if necessary, leeches and fomentations and the warm bath. The emaciation, paleness and debility sometimes continue a long time. Dr Manson, who has published the most extensive clinical inquiry into the action of iodine, ascribes these bad effects to the dose being excessive, for they never occurred to him except in a very slight degree, and in a few peculiar constitutions. The use of iodine is contra-indicated in pregnancy, in a disposition to menorrhagia, to diseases of the chest, and in marasmus and slow fever, whatever may be the cause.

From analogy, Dr Coindet was induced to try iodine in indolent scrofulous tumours, and his trials were attended with success. Both in them and in goitres he also used it externally, by rubbing in, night and morning, the size of a nut of an ointment composed of half a drachm of hydriodate of potass and an ounce and a half of lard. Except dissolving the tumours the ointment produced no sensible effect; but the application of a plaster containing it excited an eruption of pustules, like the ointment of tartrate of antimony. Dr Coindet is said to confine himself now to its external use, he finds it so efficacious and free from danger. I find that iodine and hogslard mix intimately, forming an orange ointment, not unlike that of the red oxide of mercury. But by far the best external form is that used by Dr Manson, prepared by mixing a drachm of tincture of iodine with an ounce of anodyne balsam. This liniment can be kept in a glass-stoppered bottle.

STANNUM. *Lond. Ed. Dub.*

Off.—a) Tin-filings.

LIMATURA STANNI. *Lond. Dub. Ed.*

b) Powder of tin.

PULVIS STANNI. *Dub. Ed.*

TIN is a brilliant-white metal, sapid and odorous; specific gravity 7.291 to 7.500; soft, flexible, and emitting a crackling noise when bent; very malleable; fusing at 442° Fahrenheit; oxidizes slowly in the air; is converted, when fused, into a grey oxide; when red hot it burns vividly. Sulphuret and phosphuret are lamellated and brittle; it forms alloys with arsenic, bismuth, antimony, mercury, and zinc; it is oxidized by many acids, and combines with the muriatic, fluoric, boracic, and carbonic acids.

It is found,
1. Sulphuretted, and combined with copper. Tin-pyrites.
2. Oxydized.
   a. Combined with oxide of iron and silica. Common tinstone.
   b. Combined with oxide of iron, and a little arsenic. Fibrous tinstone.

The best tin is found in Cornwall, or is brought from the East Indies. Its purity is estimated by its small specific gravity, and by the crackling noise it makes when bent.

It was used only as an anthelmintic, especially in cases of tænia, and probably acted mechanically; but it is now laid aside.

STAPHISAGRIÆ SEMINA. *Lond. Dub.* See DELPHINIUM.

STRAMONII SEMINA ET FOLIA. *Lond. Dub.* See DATURA.

STYRAX.

Willd. *g.* 874. *Decandria Monogynia.*—Nat. ord. *Bicornes,* Linn., *Diospyreæ,* Juss.

Sp. 1. STYRAX OFFICINALE. *Ed. Lond. Dub.*

Off.—The balsam, called Storax.

BALSAMUM STYRACIS OFFICINALIS. *Ed.*
BALSAMUM STYRACIS. *Lond.*
STYRAX CALAMITA; resina. *Dub.*

THIS tree grows in the Levant, Italy, and France. The storax flows from wounds made in the bark, in countries where the heat is sufficient; for neither in France nor in Italy does it furnish any. It occurs either in small distinct tears, of a whitish or reddish colour, or in large masses composed of tears, or in masses of an uniform texture, and yellowish-red or brownish colour; though sometimes likewise interspersed with a few whitish grains.

The *common storax* of the shops is in large masses, considerably lighter and less compact than the foregoing; it appears on examination to be composed of a resinous juice, mixed with saw-dust.

Storax has an agreeable smell and an aromatic taste. Neumann got from 480 grains, 360 alcoholic, and 30 of watery extract; and inversely, 120 watery, and 240 alcoholic. In distillation it yielded benzoic acid. It is therefore a balsam, or natural combination of resin with benzoic acid.

Sp. 3. STYRAX BENZOIN. *Ed. Lond. Dub.*
Off.—The balsam, called Benzoin.

BALSAMUM STYRACIS BENZOINI, *vulgo* Benzoinum. *Ed.*
BENZOINUM; balsamum. *Lond.*
BENZOE; resina. *Dub.*

THIS species grows in Sumatra, and like the former also furnishes a balsam on being wounded, which is brought from the East Indies in large masses, composed of white and light brown pieces, with yellowish specks, breaking very easily betwixt the hands: that which is whitest, and freest from impurities, is most esteemed.

In its properties it differs from storax only in containing a larger proportion of benzoic acid. Neumann found that it was totally soluble in alcohol, forming a blood-red tincture, and that water extracted no gummy matter, but a notable proportion of benzoic acid. By sublimation he got two ounces of impure acid from sixteen of benzoin. Lime and the alkaline carbonates dissolve the acid without attacking the resin, and are accordingly employed in the process of Scheele, Gottling, and Gren, for obtaining the benzoic acid. I find that the solution of potass dissolves benzoin very rapidly, forming a dark coloured solution, mixed with fine crystals of benzoat of potass. This alkaline solution is not decomposed by water, but forms with acids a rose-coloured coagulum, easily soluble in excess of acid. Boiling nitrous acid also attacks benzoin with great violence, and dissolves it entirely; the solution becomes turbid, and lets fall a copious precipitate on cooling, which, according to Mr Brande, is benzoic acid. It is decomposed by water, and by alkaline solutions.

SUCCINUM. *Ed. Lond. Dub.*
Amber.

THIS is a solid, brittle, bituminous substance, dug out of the earth, or found upon the sea-shores, especially along the coasts of Polish Prussia and Pomerania. It is of a white, yellow, or brown colour, sometimes opaque, and sometimes very clear and transparent.

It emits an agreeable smell when heated or rubbed. By friction it becomes electric; and when heated it softens, swells, and then melts, and burns with a greenish or bluish flame, leaving a coaly residuum. By distillation it affords a little acetic acid, an empyreumatic oil, and a peculiar acid, named from it the Succinic. It is not acted upon by water or diluted acids. It is imperfectly dissolved in alcohol and ether. Hoffmann dissolved it in oil of almonds in Papin's digester, and in a boiling solution of potass. Dr Thomson has discovered that it is soluble in the cold, even in a very weak solution of the subcarbonate of potass. Amber is rendered soluble in the fixed and volatile oils, by melting or roasting it, or by the addition of a little camphor.

It is used in pharmacy only for the empyreumatic oil and acid obtained from it.

SULPHAS MAGNESIÆ. *Dub.* See MAGNESIA.

SULPHAS CUPRI. *Dub.* See CUPRUM.

a) SULPHUR. *Lond.*
Roll Sulphur.

b) SULPHUR SUBLIMATUM. *Lond. Ed.*
SULPHUR SUBLIMATUM. Flores sulphuris. *Dub.*
Sublimed sulphur.

SULPHUR is a crystallizable solid, of a yellow colour; little sensible taste; peculiar smell when rubbed or heated; specific gravity 1.99; brittle; electric; fusible at 226°; burning with a pale blue flame at 302°; and with a bright white flame at 570°; and capable of combining with different proportions of oxygen. It is found in the vicinity of volcanoes, and exists in many minerals, and in some animal and vegetable substances.

In the neighbourhood of volcanoes it is sometimes found perfectly pure and crystallized; but all the sulphur of commerce is extracted from pyrites by sublimation. It is usually brought to us in large irregular masses, which are afterwards melted and cast into cylindrical rolls. Sulphur should be chosen of a bright yellow colour, should be very inflammable, and should burn with a bright pure blue flame, and should leave no residuum.

Sublimed sulphur is never prepared by the apothecary. It has the form of a very fine powder, having a beautiful yellow colour. It is often contaminated with a little sulphuric acid formed during the process, from which it is easily freed by washing.

Medical use.—Sulphur stimulates the system, loosens the belly, and promotes the insensible perspiration: it seems to pervade the whole habit, and manifestly transpires through the pores of the skin, as appears from the sulphureous smell of persons who have taken it, and from silver in their pockets being stained of a blackish colour. In the stomach it is probably combined with hydrogen. It is a celebrated remedy against cutaneous diseases, particularly scabies, both given internally, and applied externally. It has likewise been recommended in rheumatic pains, flying gout, rickets, atropha, coughs, asthmas, and other disorders of the breast and lungs, and particularly in catarrhs of the chronic kind. In hæmorrhoïdal affections it is almost specific; but in most of these cases it is advantageously combined with some cooling purgative, especially supertartrate of potass.

SULPHURETUM ANTIMONII. *Dub.* See ANTIMONIUM.

SWIETENIA.

Willd. *g.* 843. *Decandria Monogynia.*—Nat. ord. *Trihilatæ,* Linn., *Meliaceæ,* Juss.

Sp. 1. SWIETENIA MAHAGONI. *Ed.*

Mahogany tree.

Off.—The bark.

CORTEX SWIETENIÆ MAHAGONI. *Ed.*

THIS majestic tree grows principally in Jamaica and in Spanish America. Its useful wood is universally known. Its bark is brown, rough and scaly, on the branches grey and smoother. Its taste is very astringent, and more bitter than that of Peruvian bark; its smell weak and aromatic. In its action on the living body, it is a mere astringent, and no substitute for cinchona.

Sp. 2. SWIETENIA FEBRIFUGA. *Dub.*

Febrifuge Swietenia.

Off.—The bark.

CORTEX SWIETENIÆ FEBRIFUGÆ. *Dub.*

THIS species, which in many respects resembles the former, is a native of the East Indies. Its bark is red, brittle and compact, and covered with a rough grey cuticle. In its properties it agrees with the mahogany bark. It is merely an astringent bitter, and contains no cinchonin. Dr Roxburgh sent from India a quantity of the extract of this bark, which could not be distinguished from the common kino of the shops.

TABACI FOLIA. *Lond.* See NICOTIANA.

TAMARINDUS INDICA. *Ed. Dub. Lond.*

Willd. *g.* 1250, *sp.* 1. *Monadelphia Triandria.*—Nat. ord. *Lomentaceæ*, Linn., *Leguminosæ*, sect. *Cassiæ*, Juss.

Tamarind tree.

Off.—The preserved fruit.

PULPA TAMARINDI; leguminis pulpa. *Lond.*
FRUCTUS TAMARINDI. *Dub.*
FRUCTUS TAMARINDI INDICÆ. Fructus conditus. *Ed.*

THIS tree grows both in the East and West Indies. The fruit is a broad ash-coloured pod, divided by a tough membranous endocarp into several distinct cells, each containing one hard brown seed. The epicarp is thin; and the acid pulp, for which they are esteemed, is the sarcocarp. Tamarinds are preserved in two ways: commonly by throwing hot sugar from the boilers on the ripe pulp: but a better method is to put alternate layers of tamarinds and powdered sugar in a stone jar. By this means the tamarinds preserve their colour, and taste more agreeably.

East India tamarinds are longer than those from the West Indies; the former containing six or seven seeds each, the latter rarely above three or four.

Preserved tamarinds should be fresh and juicy, and should have an agreeable acid taste. They should not have a musty smell; the seeds should not be soft and swollen; and the blade of a knife should not get a coating of copper by being immersed among them.

Tamarinds contain sugar, mucilage, citric acid, supertartrate of potass, tartaric acid, and malic acid.

Medical use.—The pulp of these fruits, taken in the quantity of from two or three drachms to an ounce or more, proves gently laxative and purgative, and, at the same time, by its acidity, quenches thirst, and allays immoderate heat. It increases the action of the sweet purgatives, cassia and manna, and weakens that of the resinous cathartics.

Salts, whose base is potass, form an improper addition to tamarinds; for they are decomposed, and the tartaric acid of the fruit is precipitated in the form of supertartrate of potass.

TANACETUM VULGARE. *Dub.*

Willd. *g.* 1472, *sp.* 18.; Smith, *g.* 360, *sp.* 1. *Syngenesia*

Polygamia superflua.—Nat. ord. *Compositæ discoideæ*, Linn., *Synantheræ*, sect. *Corymbiferæ*, Juss.

Common tansy.

Off.—The leaves.

FOLIA TANACETI. *Dub.*

TANSY is perennial, and grows wild by road-sides and the borders of fields, and is also frequently cultivated in gardens, both for culinary and medicinal uses: it flowers in June and August.

Medical use.—Considered as a medicine, it is a moderately warm bitter, accompanied with a strong not very disagreeable flavour. Some physicians have had a great opinion of it in hysteric disorders, particularly those proceeding from a deficiency or suppression of the uterine purgation. The leaves and seeds have been in considerable esteem as anthelmintics. An infusion of tansy drunk as tea has been strongly recommended as a preventive of the return of gout.

TARAXACI RADIX. *Lond. Dub.* See LEONTODON.

TARTARUM. *Lond. Dub.* See POTASSA.

TEREBINTHINA VENETA. *Dub.* See PINUS.

TEREBINTHINA VULGARIS. *Dub.* See PINUS.

TESTÆ. *Lond.* See PHASIANUS.

TEUCRIUM.

Willd. *g.* 1093.; Smith, *g.* 259. *Didynamia Gymnospermia.*—Nat. ord. *Verticillatæ*, Linn., *Labiatæ*, Juss.

Sp. 12. TEUCRIUM MARUM. *Dub.*

Syrian herb mastich.

Off.—The herb.

HERBA MARI SYRIACI. *Dub.*

THIS is a small shrubby plant, indigenous in Syria, Candy, and cultivated with us in gardens. The leaves have an aromatic bitterish taste, and when rubbed betwixt the fingers a quick pungent smell, like volatile alkali, which soon affects the head, and occasions sneezing: distilled with water, they yield a very acrid, penetrating essential oil, resembling that of scurvy grass. Its powder is used as an herb snuff.

Sp. 36. Willd.; *sp.* 3. Smith. TEUCRIUM CHAMÆDRYS. *Dub.*

Wall germander.

Off.—The herb.

HERBA CHAMÆDRYOS. *Dub.*

THIS perennial herb is found plentifully in the isle of Ely and near Cambridge. It flowers in July and August. It is an aromatic bitter, and is considered to be tonic and stimulant. An infusion of it is given in ague, chlorosis, and arthritis.

TIGLII OLEUM. *Lond.* See CROTON.

TOLUIFERA BALSAMUM. *Ed. Lond. Dub.*

Willd. *g.* 828, *sp.* 1. *Decandria Monogynia.*—Nat. ord. *Lomentaceæ,* Linn., *Terebinthaceæ,* Dec.

Off.—The balsam called Balsam of Tolu.

BALSAMUM TOLUIFERÆ BALSAMI. *Ed.*
BALSAMUM TOLUTANUM. *Lond. Dub.*

THIS tree grows in Spanish America. The balsam flows from incisions made in its bark, during the hot season, and is brought to us in little gourd shells. It is of a yellowish-brown colour, inclining to red; in consistence thick and tenacious: by age it grows hard and brittle. The smell of this balsam is extremely fragrant, somewhat resembling that of lemons: its taste warm and sweetish. Lewis says, that he has sometimes procured benzoic acid from it. It yields very little volatile oil, although it impregnates the distilled water strongly with its flavour. By dissolving a proper quantity of sugar in this water, a more elegant syrup is obtained than that prepared in the common way, with a decoction of the balsams. In its medical virtues it agrees with the other balsams.

TORMENTILLA ERECTA. *Ed. Dub.* Willd.
TORMENTILLA OFFICINALIS. *Lond.* Smith.

Willd. *g.* 1001, *sp.* 1.; Smith, *g.* 236, *sp.* 1. *Icosandria Polygynia.*—Nat. ord. *Senticosæ,* Linn., *Rosaceæ,* sect. *Fragariæ,* Juss.

Septfoil. Common tormentil.

Off.—The root.

Radix tormentillæ erectæ. *Ed.*
Radix tormentillæ. *Lond. Dub.*

Tormentil is perennial, and found wild in woods and on commons: the root is crooked and knotty, of a blackish colour on the outside, and reddish within. It has an austere styptic taste, accompanied with a slight kind of aromatic flavour: it is one of the most agreeable and efficacious of the indigenous astringents, and may be employed with good effect in all cases where medicines of this class are proper.

Toxicodendri folia. *Lond.* See Rhus.

Tragacantha. *Lond.* See Astragalus.

Trifolium paludosum. *Dub.* See Menyanthes.

Triticum hybernum. *Ed. Lond. Dub.*
Willd. *g.* 152, *sp.* 2. *Triandria Monogynia.*—Nat. ord. *Gramina*, Linn. Juss.

Wheat.

Off.—Flour, starch.

a) Farina; e seminibus. *Lond. Dub.*
b) Amylum; ex tritico hyberno. *Ed.*
Amylum. *Lond. Dub.*

By some, spring and winter wheat are considered only as varieties, not as distinct species; there is no material difference in the grains they produce, which are indiscriminately employed for every purpose.

It is the presence of gluten which characterizes wheat flour; and on the due admixture of it with the other constituents depends the superiority of wheat flour for baking bread.

Bread is made by working the flour into paste with water, a quantity of some ferment, such as yeast, and a little muriate of soda to render it sapid, allowing the paste to stand until a certain degree of fermentation take place, and then baking it in an oven, heated to about 488°. During the fermentation, a quantity of gas is formed; and as it is prevented from escaping by the toughness of the paste, and dilated by the heat of the oven, the bread is rendered light and spongy. In this process, the nature of the constituents of the flour is altered, for we are not able to obtain either gluten or starch from bread.

Medical use.—Bread is not only one of the most important articles of nourishment, but is also employed in pharmacy for making cataplasms, and giving form to more active articles. An infusion of toasted bread has a deep colour and pleasant taste, and is an excellent drink in febrile diseases, and debility of the stomach.

TUSSILAGO FARFARA. *Ed. Lond. Dub.*

Willd. *g.* 1483, *sp.* 12.; Smith, *g.* 360, *sp.* 1. *Syngenesia superflua.*—Nat. ord. *Compositæ radiatæ*, Linn., *Synantheræ*, sect. *Corymbiferæ*, Juss.

Colts-foot.

Off.—The herb and flowers.

a) FOLIA TUSSILAGINIS FARFARÆ. *Ed.*
TUSSILAGO. *Lond.* Folia. *Dub.*
b) FLORES TUSSILAGINIS FARFARÆ. *Ed.*

THIS herb grows wild in moist situations, producing yellow flowers in March and April, which soon are succeeded by large roundish leaves, hairy underneath; their taste is herbaceous, somewhat glutinous and subacrid.

Medical use.—Colts-foot is recommended in coughs, phthisis, and other disorders of the breast and lungs, and some use it in scrofula. Its effects probably depend more on the milk in which it is commonly directed to be taken, than on the herb.

TUTIA. *Dub.* See ZINCUM.

ULMUS CAMPESTRIS. *Ed. Lond. Dub.*

Willd. *g.* 505, *sp.* 1.; Smith, *g.* 117, *sp.* 1. *Pentandria Digynia.*—Nat. ord. *Scabridæ*, Linn., *Ulmaceæ*, Juss.

Common elm.

Off.—The inner bark.

CORTEX ULMI CAMPESTRIS. Cortex interior. *Ed.*
CORTEX ULMI. Liber. *Dub.*
CORTEX INTERIOR ULMI. *Dub.*

THIS tree grows wild in Britain. It flowers in April. The inner bark has a yellowish colour, and a mucilaginous, bitter, astringent taste, without smell.

In decoction it has been highly recommended in the lepra ichthyosis, and has been said to cure dropsies.

VALERIANA OFFICINALIS. *Ed. Dub.* (Sylvestris). *Lond.* Willd. *g.* 75, *sp.* 6.; Smith, *g.* 15, *sp.* 3. *Triandria Monogynia.*—Nat. ord. *Aggregatæ,* Linn., *Valerianeæ,* Juss.

Wild valerian.

Off.—The root.

RADIX VALERIANÆ OFFICINALIS. *Ed.*

RADIX VALERIANÆ. *Lond. Dub.*

THIS plant is perennial, and varies in its appearance and sensible qualities, according to the situation in which it grows. In marshes and shadowy places its leaves are broader, on dry heaths and high pastures they are narrower. The roots produced in low watery grounds have a remarkably faint smell in comparison with the others, and sometimes scarcely any. The roots taken up in autumn or winter have also much stronger sensible qualities than those collected in spring and summer.

The root consists of a number of strings or fibres matted together, issuing from one common head, of a whitish or pale brownish colour. Its smell is strong, like a mixture of aromatics with fetids; the taste unpleasantly warm, bitterish, and subacrid. Trommsdorff got from it a peculiar principle soluble in water, insoluble in alcohol, a black resin, a volatile oil very liquid, green, and camphoraceous, amylum, and lignin.

Medical use.—Wild valerian is a medicine of great use in nervous disorders, proceeding from a debility of the nervous system. Some recommend it as procuring sleep, particularly in fever, even when opium fails; but it is principally useful in affections of the hysterical kind.

The common dose is from a scruple to a drachm in powder; and in infusion, from one to two drachms. Its unpleasant flavour is most effectually concealed by a suitable addition of mace.

As its virtues reside entirely in an essential oil, it should not be exhibited in decoction or watery extract.

VERATRUM ALBUM. *Ed. Lond. Dub.*

Willd. *g.* 1859, *sp.* 1. *Polygamia Monœcia.*—Nat. ord. *Liliaceæ,* Linn., *Colchiceæ,* Juss.

White hellebore.

Off.—The root.

Radix veratri albi. *Ed.*
Radix veratri. *Lond.*
Radix hellebori albi. *Dub.*

This plant grows spontaneously in Switzerland and the mountainous parts of Germany. The root has a nauseous, bitterish, acrid taste, burning the mouth and fauces. On being wounded, it emits an extremely acrimonious juice, which, when inserted into a wound, produces very violent effects. The narcotic effects of the white hellebore have been found to depend upon *Veratria*, a new alkaline principle discovered by Pelletier and Caventou, and which has been described in the observations on the *colchicum autumnale*, in which it also occurs, and which explains so satisfactorily the similarity of the effects of these two substances.

Medical use.—The powder of the dried root, applied to an issue, occasions violent purging; snuffed up the nose, it proves a strong, and not always a safe, sternutatory. Taken internally, it acts with extreme violence as an emetic, and has been observed, even in a small dose, to occasion convulsions, and even death. The ancients sometimes employed it in various obstinate cases, and always made this their last resource. According to the very ingenious analysis of Mr Moore, a vinous infusion of white hellebore, with the addition of one-fourth part of laudanum, forms the *Eau Medicinale d'Husson*, so much celebrated as a specific in gout. Mr Moore put his mixture to the test of experiment. He administered it in some cases of gout. " In these four cases, the effects of the mixed infusions were precisely the same with equal doses of the eau medicinale. In two of the cases, where two drams were given, vomiting and purging were produced; and in one case, the medicine occasioned constipation, which happens also with the eau medicinale; and the gout in all was relieved."

Veronica beccabunga. *Dub.*

Willd. *g.* 44, *sp.* 30.; Smith, *g.* 9, *sp.* 8. *Diandria Monogynia.*—Nat. ord. *Personatæ*, Linn., *Scrophulariæ*, Juss.

Brooklime.

Off.—The herb.

Herba beccabungæ. *Dub.*

This is a low perennial plant, common in little rivulets and ditches of standing water, and flowering in July. The leaves remain all the winter, but are in great perfection in the spring. Their taste is herbaceous, with a very slight bitterness. They contain, along with the volatile acrid principle, vegetable albumen and much sulphate of lime.

If any good effects be expected from brooklime, it should be used as food.

VIOLA ODORATA. *Ed. Dub.*

Willd. *g.* 446, *sp.* 12. Smith, *g.* 96, *sp.* 2. *Pentandria Monogynia.*—Nat. ord. *Campanaceæ,* Linn., *Violariæ,* Juss.

Sweet-smelling violet.

Off.—The recent flower.

FLORES VIOLÆ ODORATÆ. *Ed.*
FLORES VIOLÆ. *Dub.*

THIS plant is perennial, and is found wild under hedges and in shady places; but the shops are generally supplied from gardens. It flowers in March and April. Its flowers are so remarkable for their odour and colour, that they have given a name to both. The roots of all the violets act as emetics, and some are used as substitutes for ipecacuan, and by analysis they contain the same principle, *Emetin.*

Med. use.—The flowers impart their colour and flavour to aqueous liquors: a syrup made from the infusion has long had a place in the shops, and is said to be an agreeable and useful laxative for children, but it is chiefly valued as a delicate test of the presence of uncombined acids or alkalies, the former changing its blue to a red, and the latter to a green.

VIRGA AUREA. *Dub.* See SOLIDAGO.

VITIS VINIFERA. *Ed. Dub. Lond.*

Willd. *g.* 453, *sp.* 1. *Pentandria Monogynia.*—Nat. ord. *Hederaceæ,* Linn., *Viniferæ,* Juss.

The vine.

THE vine grows in temperate situations in many parts of the world, and is cultivated very generally for the sake of its agreeable subacid fruit. Before they are ripe, grapes are extremely harsh and acid, and by expression furnish a liquor which is called Verjuice. It contains malic acid, super-tartrate of potass, and extractive, and may be made to furnish wine by the addition of sugar. As the grape advances to maturity, the quantity of sugar in it increases, while that of malic acid diminishes: it however never disappears entirely. When thoroughly ripe, the grape is one of the most agreeable fruits. It is cooling, antiseptic and nutritious, and when eaten in considerable quantity, diuretic, and gently laxative. In inflammatory diseases, and all others where acids are indicated, grapes form an excellent article of diet.

Off.—Sun-raisins.

FRUCTUS VITIS VINIFERÆ. Fructus siccatus. *Ed.*
UVÆ PASSÆ SOLE SICCATÆ. *Dub.*
UVÆ PASSÆ; baccæ præparatæ. *Lond.*

RAISINS are grapes which have been carefully dried. By this means not only the water they contained is dissipated, but the quantity of acid seems to be diminished. They become more saccharine, mucilaginous, and laxative, than the recent grape, but are less cooling.

Off.—Sherry.

VINUM ALBUM HISPANUM; Anglice *Sherry*. *Ed.*

WINE is the juice of the grape altered by fermentation. The numerous varieties of wine depend principally on the proportion of sugar contained in the must, and the manner of its fermentation. When the proportion of sugar is sufficient, and the fermentation complete, the wine is perfect and generous: if the quantity of sugar be too large, part of it remains undecomposed, as the fermentation is languid, and the wine is sweet and luscious: if, on the contrary, it be too small, the wine is thin and weak; and if it be bottled before the fermentation be completed, it will proceed slowly in the bottle, and on drawing the cork, the wine will sparkle in the glass, as, for example, Champagne. When the must is separated from the husk of the grape before it is fermented, the wine has little or no colour: these are called White wines. If, on the contrary, the husks are allowed to remain in the must while the fermentation is going on, the alcohol dissolves the colouring matter of the husks, and the wine is coloured: such are called Red wines. Besides in these principal circumstances, wines vary much in flavour.

Excellent treatises on wine have been lately published by Julien in France, and by Mr Morewood and Dr Henderson in our own country.

The following tables exhibit a comparative view of the contents of different wines and spiritous liquors. The first is taken from Mr Brande. The second is from Neumann; and their remarkable differences in regard to some wines show how much they vary, or how little such experiments can be depended upon. The numbers indicate the quantity of alcohol of sp. gr. 0.825 in 100 parts of the wine.

	Strongest.	*Medium*	*Weakest.*
Scotch whisky,		54.32	
Irish whisky,		53.90	
Rum,		53.68	
Brandy,		53.39	
Hollands,		51.60	
Lissa wine,	26.47	25.41	24.35
Raisin wine,	26.40	25.12	23.20
Marsala,	26.03	25.09	25.05
Madeira,	24.42	24.17	23.93
Port,	25.83	22.96	21.40
Currant wine,		20.55	
Cape Madeira,	22.94	20.51	18.11
Madeira, red,	22.30	20.35	18.40
——— sercial,	21.40	20.34	19.24
Teneriffe,		19.79	
Colares,		19.75	
Constantia, white,		19.75	
Lachryma Christi,		19.70	
Sherry,	19.83	19.17	18.25
Vidonia,		19.25	
Lisbon,		18.94	
Bucellas,		18.49	
Constantia, red,		18.92	
Calcavalla,	19.20	18.65	18.10
Cape muscat,		18.25	
Rousillon,	19.00	18.13	17.26
Grape wine,		18.11	
Malaga,	18.94	18.10	17.26
White hermitage,		17.43	
Alba flora,		17.26	
Zante,		17.05	
Malmsey madeira,		16.40	
Sheruaz,		15.52	
Lunel,		15.52	
Syracuse,		15.28	
Claret,	17.11	15.10	12.91
Nice,		14.63	
Burgundy,	16.60	14.57	11.95
Sauterne,		14.22	
Barsac,		13.86	
Champagne, still,		13.30	
Vin de Grave,	13.94	13.37	12.80
Tent,		13.30	
Champagne, sparkling,		12.80	
Frontignac, rivesalte,		12.79	
Cote rotie,		12.32	
Red hermitage,		12.32	
Gooseberry wine,		11.84	
Hock,	14.37	12.08	8.88
Champagne, red,	12.56	11.93	11.30
Orange wine,		11.26	
Tokay,		9.88	
Elder wine,		8.79	
Cyder,	9.87	7.54	5.21
Perry,		7.26	
Ale, Burton,		8.88	
——— Edinburgh,		6.20	
——— Dorchester,		5.56	
——— average,		6.87	
Brown stout,		6.80	
London porter,		4.20	
Small beer,		1.28	

The first column in this Table shews the quantity of rectified spirit; the second that of thick, oily, unctuous, resinous matter; the third of gummy and tartareous matter; and the fourth of water in 17280 parts.

	I.	II.	III.	IV.
Malmsey,	1920	2100	1140	12120
Alicant,	1800	2900	100	12840 ?
Neufchatel,	1560	1920	900	12900
French,	1440	400	60	15380
Frontignac,	1440	1680	320	13830
Muscadine,	1440	1200	480	14160
Salamanca,	1440	1680	960	13200
Sherry,	1440	2880	1080	11880
Tin to	1440	3120	840	11800
Hermitage,	1380	600	100	15200
Monte Pulciano,	1320	180	160	15620
Carcassone,	1320	250	80	15630
Champagne,	1280	400	60	15540
Canary,	1140	1200	2160	12780
Madeira,	1140	1560	960	13620
Moselle,	1080	260	90	15850
Rhenish,	1080	200	94	15906
Tokay,	1080	2100	2400	11700
Burgundy,	1080	240	100	15860
Old Rhenish,	960	480	140	15700
Pontac,	960	320	120	15880
White Brandenburgh,	960	420	180	14880 ?
Vin de grave,	960	360	120	15840
Red Brandenburgh,	840	280	120	16040
Aland,	840	1560	780	14100
Red Tyrol,	720	600	240	15120
Spanish,	600	1200	4560	10920

Medical use.—Wine, taken in moderate quantities, acts as a beneficial stimulus to the whole system. It promotes digestion, increases the action of the heart and arteries, raises the heat of the body, and exhilarates the spirits. Taken to excess, it produces inebriety, which is often succeeded by headach, stupor, nausea, and diarrhœa, which last for several days. Habitual excess in wine debilitates the stomach, produces inflammation of the liver, weakens the nervous system, and gives rise to dropsy, gout, apoplexy, tremors, and cutaneous affections.

To convalescents, and in all diseases of general debility, and deficiency of the vital powers, wine is the remedy on which we must place our chief dependence. It is contra-indicated in all inflammatory complaints, and when it sours upon the stomach.

UVÆ URSI FOLIA. *Lond. Dub.* See ARBUTUS.

WINTERA AROMATICA. *Ed.*

Willd. *g.* 1063. *Polyandria Tetragynia.*—Nat. ord. *Oleraceæ*, Linn., *Magnoliaceæ*, Juss.

Off.—Winter's bark.

CORTEX WINTERÆ AROMATICÆ. *Ed.*

THIS was first discovered on the coast of Magellan by Captain Winter, in the year 1567. The sailors then employed the bark as a spice, and it was afterwards found serviceable in the scurvy, for which purpose it is at present also sometimes made use of in diet drink. The true Winter's bark is not often met with in the shops, Canella alba being generally substituted for it. The Winter's bark is in large pieces, of a more cinnamon colour than the canella, and much warmer and more pungent. Its smell resembles that of cascarilla. Its virtues reside in a very hot, stimulant, volatile oil. M. Henry found in it resin, volatile oil, tannin, a colouring matter, and some salts. Canella contains no tannin. It is much used in Brazil as a spice.

ZEDOARIA. *Dub.* See AMOMUM.

ZINCUM. *Ed. Dub. Lond.*
Zinc.

ZINC is bluish-white, lamellated, sapid, and odorous; specific gravity 7.190; soft, clogging the file; above 212° malleable and ductile; fusible at 700°; vaporizable; a powerful agent in the phenomena of galvanism; oxidized by fusion; at a red heat it catches fire, and emits white films of oxide; it easily decomposes water; it is oxidized and dissolved by almost all the acids.

It is always found oxidized,

1. Combined with a greater or less proportion of carbonic acid. Calamine.
2. Combined with sulphur. Blende.
3. Combined with sulphuric acid, generally in solution.

The ores of zinc are rarely worked by themselves, or with the sole intention of extracting zinc, but are generally melted with the lead ores, particularly galena, which they commonly accompany. By this process the zinc is obtained in two forms; part of it is sublimed in the state of an oxide, and attaches itself to the chimney of the furnace, in the form of a grey, granular, earthy like incrustation, which is known by the name of Tutty or Cadmia; and part of it is sublimed in its metallic form, and is condensed in the throat of the chimney, in small grains, which are afterwards melted in a crucible, and cast in ingots.

OXIDUM ZINCI IMPURUM. *Ed.*
TUTIA. *Dub.*
Impure oxide of zinc. Tutty.

IT is moderately hard and ponderous; of a brownish colour, and full of small protuberances on the outside, smooth and yellowish within; some pieces have a bluish cast, from minute globules of zinc in its metallic form. Tutty is celebrated as an ophthalmic, and frequently employed as such in unguents and collyria, and as an exsiccant in the *Intertrigo* of infants.

CARBONAS ZINCI IMPURUS, V. S. Lapis calaminaris. *Ed.*

CALAMINARIS, Oxydum zinci in usum eorum, qui Orichalcum conficiunt. *Dub.*

CALAMINA, S. S. Carbonas zinci impura. *Lond.*

Impure carbonate of zinc. Calamine.

THIS mineral is found plentifully in England, Germany, and other countries, either in distinct mines, or intermingled with the ores of different metals. It is usually of a greyish, brownish, yellowish, or pale reddish colour, without lustre or transparency; fracture commonly uneven or earthy; considerably hard. Before the blowpipe it decrepitates, but does not melt, and becomes yellower, and is sublimed. It is partly soluble in acids, and often effervesces with them.

Mr Smithson has analysed several varieties of calamine. England and Carinthia furnish the best. Its specific gravity is 4.33, and it contains 65 *per cent.* of oxide of zinc, while the calamine from Hungary and Fribourg has a specific gravity of 3.5, and contains from 25 to 50 *per cent.* of quartz.

Calamine is generally roasted before it comes into the shops, to render it more easily reducible into a fine powder. In this state it is employed in collyria, against defluxions of thin acrid humours upon the eyes, for drying up moist running ulcers, and healing excoriations.

ZINGIBERIS RADIX. *Lond. Dub.* See AMOMUM.

PART III.

PREPARATIONS AND COMPOSITIONS.

CHAP. I.—SULPHUR.

SULPHUR SUBLIMATUM LOTUM. *Edin.*
Washed Sublimed Sulphur.

Take of
Sublimed sulphur, one part;
Water, four parts.

Boil the sulphur for a little in the water, then pour off this water, and wash away all the acid by affusions of cold water; and, lastly, dry the sulphur.

Dub.

Let warm water be poured upon sublimed sulphur, and the washing be repeated as long as the water, when poured off, is impregnated with acid, which is known by the test of litmus. Dry the sulphur on bibulous paper.

SULPHUR LOTUM. *Lond.*
Washed Sulphur.

Take of
Sublimed sulphur, a pound.

Pour on it boiling water, so that the acid, if there be any, may be entirely washed away; then dry the sulphur.

As it is impossible to sublime sulphur in vessels perfectly void of air, a small portion of it is always acidified and converted into sulphurous or sulphuric acid. The presence of acid in sulphur is an impurity, and must be removed by careful ablution. Sulphur is directed to be kept in closed vessels; and Dr Powell says, that in an open drawer, its superior surface becomes manifestly acid on long keeping;

but when thoroughly washed, sublimed sulphur is not acted upon by the atmosphere; there is therefore no particular reason for preserving it from the action of the air; for if, on keeping, it become moist, it is because the sulphuric acid has not been entirely washed away.

SULPHUR PRÆCIPITATUM. *Lond.*
Precipitated Sulphur.

Take of
- Sublimed sulphur, one pound;
- Fresh lime, two pounds;
- Water, four gallons.

Boil the sulphur and lime together in the water, then filter the liquor through paper, and drop into it as much muriatic acid as may be necessary to precipitate the sulphur. Lastly, wash this by repeatedly pouring upon it water till it becomes insipid.

BY boiling lime and sulphur together in water, water is decomposed; and, without the evolution of any gas, sulphuric acid and sulphuretted hydrogen are found. These unite with the lime, forming sulphate of lime and hydro-sulphuret of lime; but the latter combines with an additional proportion of sulphur, forming sulphuretted hydro-sulphuret of lime, which is the solution obtained by filtration in the first part of the process. This is of a golden yellow colour; and as it is very rapidly decomposed by contact with air, it is to be immediately decomposed by muriatic acid, which unites with the lime, expels the sulphuretted hydrogen, and precipitates the additional sulphur, which is easily purified by ablution from the very soluble muriate of lime. This process, at least on a small scale, often fails, and, instead of the light white powder, we obtain the sulphur partly or entirely in the state of a viscid yellow and very fetid paste, called *Stink-resin* by the Germans. In experiments which I made, it seemed to arise from adding the acid too quickly and in excess. The quantity of lime used in forming the hydro-sulphuret, though reduced in the edition 1815 from three pounds to two, is still somewhat too large. Mr Phillips found that 10 parts of sulphur dissolve only about 4.5 of lime. According to the atomic doctrine, 2 of sulphur with 2.5 of lime form the sulphuret, and the deuto-sulphuret would contain 4 of sulphur, and it is the second proportion only which is precipitated,

Precipitated sulphur does not differ from other sulphur, except in its form of aggregations, and its perhaps containing a very little water. It has been suspected to contain sulphuretted hydrogen, as it emits the characteristic smell on being rubbed with acids. It occurs in cakes of a very loose and light substance, without taste or smell, of a yellowish white verging into greyish white; totally soluble in boiling solution of caustic potass, and easily fusible; totally vaporizable by heat. It is liable to many adulterations from sulphuric acid, or solution of alum, or of sulphate of magnesia being used instead of muriatic acid to precipitate the sulphur, which increase the product by the admixture of sulphate of lime, alumina, or magnesia. These adulterations may be suspected when it is of a brilliant white colour, and are known by not being totally vaporizable by a red heat.

Precipitated sulphur, though much more expensive, possesses no advantage over well-washed sublimed sulphur, unless its whiter colour be considered as an advantage in the preparation of ointments.

SULPHURETUM POTASSÆ. *Edin.*
Sulphuret of Potass.

Take of
  Subcarbonate of potassa, two parts;
  Sublimed sulphur, one part.
Triturate them together, put them into a large coated crucible, fit a cover to it, and having applied live coals cautiously round it, bring the mixture at length to a state of fusion.
  Keep the mass in a very close phial.

Lond.

Take of
  Washed sulphur, one ounce;
  Subcarbonate of potass, two ounces.
Triturate them together, and place them in a covered crucible over the fire until they unite.

SULPHURETUM KALI. *Dub.*
Sulphuret of Kali.

Take of
  Subcarbonate of kali,
  Sublimed sulphur, each two ounces.
Mix and put them into a crucible. Fit a cover to it, and expose them to a heat, gradually increased, until they unite.

In this process a sulphuret of potassium is formed. The exact mode of decomposition has not been ascertained; and it perhaps varies according to the proportions used and the heat applied. Great part of the potassa loses its oxygen, which combines with part of the sulphur, and forms an acid which unites with the undecomposed potassa: the potassium formed unites with another portion of the sulphur, and the whole carbonic acid and water are expelled. But part of the sulphur is volatilized without change, and is apt to inflame. Berzelius has described no less than five sulphurets of potassium with 1. 2. 3. 4. 5 proportionals of sulphur to one of potassium. This will explain how such very different proportions of salt of tartar and sulphur have been directed by different chemists. By calculation 8 parts of sulphur should decompose 44 of salt of tartar, or 24 of potassa, to form a proto-sulphuret. Eighteen parts of the potassa furnish 3 of oxygen to combine with 2 of the sulphur, forming 5 of sulphuric acid, which combine with the 6 undecomposed potassa, and form 11 sulphate of potassa. The 15 potassium thus liberated join with 6 of the sulphur and form 21 proto-sulphuret of potassium. If with the same quantity of salt of tartar 14. 20. 26. 32 be employed, a 2. 3. 4. 5 sulphuret will be formed. The product of the operation is in all cases a mixture of sulphate of potass with sulphuret of potassium.

There is another method of preparing sulphuret of potassium, by decomposing sulphate of potass by charcoal.

Hermbstadt heats together in a crucible four parts of sulphate of potass with one of charcoal powder. The charcoal is converted into carbonic acid gas, and the sulphate into sulphuret. The proportions here agree very nearly with calculation, 2.25 of carbon should decompose 11 of sulphate of potass; there should be formed 6.75 carbonic acid, and 6.5 sulphuret of potassium.

Sulphuret of potass, properly prepared, is of a liver brown colour, and was hence formerly called *Hepar sulphuris.* It should be hard, brittle, and have a vitreous fracture. It has an acrid bitter taste, and the smell of sulphur. It is exceedingly prone to decomposition. It is deliquescent in the air, and is decomposed. It is very fusible, but a strong heat separates the excess of sulphur above the proto-sulphuret by sublimation. The moment it comes in contact with water, there is a mutual decomposition. The oxygen of the water combines with the potassium to form potassa, and the hydrogen with the sulphur to form hydrothionic acid, (sulphuretted hydrogen,) and the result is hydro-sulphuret of potass, which, on most occasions, is united with additional proportions of sulphur. By acids, sulphuret of potassium is immediately decomposed; the acid combines with the potassium, sulphuretted hydrogen gas is expelled, and the additional sulphur is precipitated.

AQUA SULPHURETI KALI. *Dub.*
Water of Sulphuret of Kali.

Take of
  Sublimed sulphur, half an ounce;
  Water of caustic kali, nine ounces, by measure.
Boil for ten minutes, and strain through paper. Keep the liquor in phials well corked.
The specific gravity of this liquor is 1120.

THE Dublin college have thus, besides the sulphuret of potassium, a preparation which is exactly similar to a solution of it in water. When sulphur is boiled in a solution of caustic alkali, a portion of the water is decomposed; the oxygen unites with one portion of sulphur to form sulphuric acid, and the hydrogen with another portion to form sulphuretted hydrogen, which combine with the potassa. The solution must be well preserved from the action of the air, which gradually decomposes it, forming sulphate of potass.

Medical use.—Hydro-sulphuret of potassa is an exceedingly nauseous remedy; but it is used internally as an antidote to metallic poisons, to check excessive salivation from mercury, and in cutaneous affections. Externally, it is used against porrigo, and in scabies. I have long been in the habit of using with success in the scabies and psoriasis of infants, a bath prepared by dissolving sulphuret of potass in water.

SULPHURETUM FERRI. *Ed.*
Sulphuret of Iron.

Take of
  Purified filings of iron, three parts;
  Sublimed sulphur, one part.
Mix and expose them to a moderate degree of heat, in a covered crucible, until they unite into a mass.

Dub.

Take of
  Filings of iron, six ounces;
  Sublimed sulphur, two ounces.

Mix and expose them in a covered crucible to a gentle heat until they unite.

The sulphuret of iron is only used in pharmacy for the preparation of hydro-sulphuret of ammonia. Proust proved that iron is capable of combining with two proportions of sulphur. At a high temperature, 35 parts of iron combine with 20 of sulphur, and form a compound of a dull blackish colour. In this state, it is fit for the production of sulphuretted hydrogen gas. At a lower temperature, the same quantity of iron takes up 40 of sulphur, forming a bi-sulphuret, acquires a greenish-yellow colour, and in every respect resembles native pyrites. This cannot be decomposed by acids, and is therefore unfit for the production of gas; but it may be reduced to the state of iron sulphuretted to the minimum, by exposing it to a sufficiently high temperature, or by melting it with half its weight of iron-filings. Mr Cruickshank, who first suggested the use of hydro-sulphuret of ammonia in medicine, directs the sulphuret of iron to be prepared by heating a bar of iron to a white heat in a smith's forge, and rubbing against the end of it a roll of sulphur. The iron, at this temperature, immediately combines with the sulphur, and forms globules of sulphuretted iron, which should be received in a vessel filled with water. It is, however, more conveniently obtained in the manner directed by the colleges.

HYDRO-SULPHURETUM AMMONIÆ. *Ed.*
Hydro-Sulphuret of Ammonia.

Take of
Water of ammonia,
Sulphuret of iron, of each four ounces;
Muriatic acid, eight ounces;
Water, two pounds and a half.

Pour the acid, previously mixed with the water, on the sulphuret, and pass the gas extricated from them through the water of ammonia. Keep the liquor in very close phials.

HYDRO-SULPHURETUM AMMONIÆ. *Dub.*
Hydro-Sulphuret of Ammonia.

Take of
Sulphuret of iron in coarse powder, four ounces;
Muriatic acid, seven ounces, by measure;
Water, two pints;
Water of caustic ammonia, four ounces.

Put the sulphuret into a matrass, then gradually pour on the acid diluted with the water, and in a proper apparatus transmit the gas evolved, through the water of ammonia. Towards the end of the operation apply a gentle heat to the matrass.

SULPHURETTED hydrogen is capable of combining with different bases in the manner of an acid; and indeed it is now admitted that oxygen is not the only acidifying principle, but that hydrogen and other elements possess the same property. It has therefore been proposed to call the substance now in question *Hydro-sulphuric acid*, but as the same term has been unfortunately applied to sulphuric acid containing water, the unambiguous term *Hydrothionic acid* is preferable. In the present preparation, sulphuretted hydrogen is combined with ammonia, and is obtained by decomposing sulphuret of iron by dilute muriatic acid. The water is decomposed, the oxygen unites with the iron to form protoxide, and the hydrogen with the sulphur to form hydrothionic acid; the muriatic acid combines with the protoxide, and the hydrothionic acid is expelled as a gas. The combination of this with ammonia is facilitated by reduction of temperature, and by making it pass through a column of the water of ammonia, by means of an apparatus, such as Woulfe's, or Nooth's. The ammonia very readily assumes a greenish-yellow colour, from the absorption of the sulphuretted hydrogen. When ammoniacal and hydrothionic gases are mixed in proper proportion, beautiful crystals are precipitated in the air.

AQUA SULPHURETI AMMONIÆ. *Dub.*
Water of Sulphuret of Ammonia.

Take of
Fresh burnt lime,
Muriate of ammonia in powder, each four ounces;
Sublimed sulphur,
Warm water, each two ounces, by weight.

Sprinkle the water upon the lime placed in an earthen vessel, and cover it up until the lime falls to powder, which, as soon as it is cold, is to be mixed by trituration with the sulphur and muriate of ammonia. Put the mixture into a retort, and distil with a sudden and sufficiently strong degree of heat. Keep the liquor thus obtained in a phial, accurately closed with a glass stopper.

THIS second process of the Dublin College is totally different. The muriate of ammonia is decomposed by part of the lime, muriate of lime is formed, and ammonia disengaged: another portion of the lime acts upon the sulphur and water, as already described in SULPHUR PRÆCIPITATUM, and the hydrothionic acid disengaged in combination with the ammonia is distilled over with a portion of water.

The hydro-sulphuret of ammonia thus prepared was formerly called the *Fuming liquor of Boyle.* It is of a dark red colour, and is extremely fetid. It differs from the hydro-sulphuret of ammonia, prepared by the preceding process, in containing a portion of uncombined ammonia, to which, according to Berthollet, its property of emitting fumes is owing, and in the last portions which come over being in the state of a bi-sulphuret. It soon, however, is converted into a hydro-sulphuret, by losing its excess of ammonia and sulphur. It is decomposed by all acids, and almost all metallic solutions.

Medical use.—Hydro-sulphuret of ammonia acts powerfully on the living system. It induces vertigo, drowsiness, nausea, and vomiting, and lessens the action of the heart and arteries. It therefore seems to be a direct sedative. According to the doctrine of the chemical physiologists, it is a powerful disoxygenizing remedy. It has been used only in diabetes, by Dr Rollo and others, under the name of Hepatized ammonia, in doses of five or ten drops twice or thrice a-day.

CHAP. II.—ACIDS.

ACIDUM SULPHURICUM DILUTUM. *Ed.*
Diluted Sulphuric Acid.

Take of
  Sulphuric acid, one part;
  Water, seven parts.
Mix them.

Dub.

Take of
  Sulphuric acid, two ounces, by weight;
  Distilled water, fourteen ounces, by weight.

Having gradually mixed them, set the mixture aside to cool, and then pour off the clear liquor.

The specific gravity of this acid is 1090.

Lond.

Take of
Sulphuric acid, one fluidounce and a half;
Distilled water, fourteen fluidounces and a half.
Add the acid by degrees to the water, and mix.

The most simple form in which sulphuric acid can be advantageously employed internally, is that in which it is merely diluted with water: and it is proper that there should be some fixed standard, in which the acid in this state should be kept in the shops. It is, however, to be regretted, that the same standard with respect to strength has not been uniformly adopted; and especially that the London College should have deviated, so very remarkably, both from their own former editions and from the other colleges. In the London Pharmacopœia before 1817, one part by weight of oil of vitriol was mixed with nine of water, which gave a mixture containing in 100 parts about 11.11 of dry acid: in the subsequent editions one and a half by measure is mixed with 14 and a half of water, which furnishes a mixture containing about 15.33 of dry acid. According to Mr Phillips, 100 grains of the London dilute acid saturate 50, and a fluidrachm 31 grains of the crystallized subcarbonate of soda. In the Edinburgh and Dublin Pharmacopœias, the strong acid is an eighth of the mixture, giving exactly one drachm in the ounce, which has at least the merit of convenience in pharmaceutic calculation. The quantity of dry acid contained in this mixture is about 12.5, which is intermediate between the dilute acids of the old and new editions of the London. The dilution by means of distilled water is preferable to spring water, which even in its purest state is not free from impregnations affecting the acid. Even when distilled water is used, there is often a small quantity of a white precipitate, arising from lead dissolved in the acid.

Sulphuric acid has a very strong attraction for water; and their bulk, when combined, is less than that of the water and acid separately. At the same time, there is a very considerable increase of temperature produced, which is apt to crack glass vessels, unless the combination be very cautiously made; and for the same reason, the acid must be poured into the water, not the water into the acid.

The greatest heat is evolved, according to Dr Ure, by mixing 73 parts of oil of vitriol with 27 of water, and the greatest condensation takes place.

Table of the Quantity of Liquid and Dry Sulphuric Acid in 100 *parts of Dilute, by Dr Ure, from actual experiment.*

Liquid.	Dry.	Sp. Gr.	Liquid.	Dry.	Sp. Gr.
100	—81.63	1.8460	40	—32.61	1.2499
95	77.55	1.8340	35	28.54	1.2572
90	73.47	1.8070	30	24.46	1.2184
85	69.39	1.7640	25	20.38	1.1792
80	65.30	1.7080	20	16.31	1.1410
75	61.22	1.6500	19	15.49	1.1330
73	59.52	1.6321	16	13.05	1.1090
70	57.08	1.5975	15	12.23	1.1019
65	53.00	1.5390	14	11.41	1.0953
60	48.92	1.4860	13	10.60	1.0887
55	44.85	1.4360	10	8.15	1.0682
50	40.77	1.3884	8	6.52	1.0544
45	36.69	1.3440	5	4.08	1.0336

Med. use.—Diluted sulphuric acid is an excellent tonic, exciting appetite, promoting digestion, quenching thirst, and checking fermentation in the stomach, and it is therefore used with success in morbid acidity, weakness, and relaxation of the stomach. As an astringent, it is used in hæmorrhagies; and from its refrigerant and antiseptic properties, it is a valuable medicine, in many febrile diseases, especially those called putrid. If taken in any considerable quantity, or for some time, it seems to pass off undecomposed by the kidneys or skin; and it is perhaps by its stimulant action on the latter, that it is advantageously employed internally in scabies, and other cutaneous affections. The best mode of prescribing it, is to order the quantity of acid to be used, and to direct it to be mixed with as much water as will render it palatable, to which some syrup or mucilage may be added. To prevent it from attacking the teeth, it may be conveniently sucked through a quill, and the mouth should be carefully washed after each dose with water, or a dilute alkaline solution.

Externally it is used as a gargle, particularly in putrid sore throats, and in aphthous mouths, and as a wash in cutaneous eruptions and ill-conditioned ulcers. Made into an ointment with sixteen times its weight of axunge, it has been used to cure psora.

ACIDUM NITROSUM. *Ed.*
Nitrous Acid.

Take of
Nitrate of potass, bruised, two pounds;
Sulphuric acid, sixteen ounces.

Having put the nitrate of potass into a glass retort, pour upon it the sulphuric acid, and distil in a sand-bath with a heat gradually increased, until the iron pot begins to be red-hot.

The specific gravity of this acid is to that of distilled water as 1520 to 1000.

Dub.

Take of
Nitrate of kali, six pounds;
Sulphuric acid, four pounds.

Mix and distil, until the residuum becomes dry.

The specific gravity of this acid is 1500.

ACIDUM NITRICUM. *Ed.*
Nitric Acid.

Take of
Nitrous acid, any quantity.

Put it into a glass retort, and having adapted a cold receiver, apply a very gentle heat, until the reddest portion shall have passed over, and the acid which remains in the retort, when almost deprived of colour, shall have become nitric acid.

Lond.

Take of
Nitrate of potass dried,
Sulphuric acid, each two pounds by weight.

Mix in a glass retort, and by means of a sand-bath distil off the nitric acid until red fumes appear. Then re-distil the acid in the same manner, having previously added another ounce of dried nitrate of potass.

The specific gravity of nitric acid is 1.5 to 1100.

212 grains of subcarbonate of soda are saturated by 100 grains of this acid.

NITRE is an anhydrous salt, and consists of potass 6, combined with nitric acid 6.75 = 12.75. Potass has a greater affinity for sulphuric than for nitric acid, especially when heat is applied: sulphate of potass is formed, which remains fixed, and the nitric acid is evolved in the form of vapours which afterwards condenses as it cools. Part of the nitric acid, however, is at the same time decomposed. The first portion of vapour which comes over is generally red, and when condensed smokes; afterwards the chief part of the product may be obtained pale or colourless; towards the end it again becomes red and smoking, and oxygen gas is at the same time evolved.

The object of the chemist is to get the product of the purest quality, and largest quantity, with the least expense of materials. It is therefore necessary to avoid every source of contamination; to employ the quantity of sulphuric acid which is necessary to decompose the nitre advantageously, and to prevent as much as possible the decomposition of the nitric acid separated.

The decomposition is generally effected in a glass retort: manufacturers use green glass. Into this the nitre coarsely powdered is first introduced, and the acid is then poured upon it; in doing which, means must be taken to prevent it from soiling the neck of the retort. When a common receiver is used, an adopter should be interposed between them, which need not be luted with the neck of the retort, but must be accurately luted with the neck of the receiver with fat lute, or one of pipe clay, sand and cut tow. The receiver should be tubulated with a bent tube dipping into water. Instead of a common receiver some modification of Woulfe's apparatus may be used with advantage. In preparing it in large quantities for the arts, some manufacturers use earthen or cast-iron retorts very thick, with an earthen head and a series of condensers.

Very different proportions of the materials have been recommended. The London College before 1809 used 60 nitre with 29 sulphuric acid; and manufacturers still employ rough nitre with half its weight of oil of vitriol: we may be therefore certain that it is not uneconomical. The London College now use equal parts of nitre and oil of vitriol, and the Edinburgh and Dublin the proportions of six to four. The advantages from the additional dose of the acid are the more perfect decomposition of the nitre, the increase of the product from the greater quantity of water furnished by the acid, and the greater solubility of the residuary salt, which can be dissolved out of the retort.

Mr Phillips censures the middle proportions ordered by the Edinburgh and Dublin Colleges, as being inconsistent with the atomic doctrine. He contends, that one proportion of strong sulphuric acid, 61.25, is sufficient to decompose one proportion of nitrate of potass, 127.5; but that two proportions of the acid, 122.5, are necessary for procuring the whole acid, 67.5, of the salt.

To explain this it is necessary to understand that nitric acid cannot exist, even in the state of gas, without the presence of water, of which two proportionals, 22.5, are assumed to be necessary for the constitution of one of nitric acid by combination with its elements, 67.5. Now, one proportional of oil of vitriol contains only one of water 11.25, which is not capable of condensing more than one half of the elements of the nitric acid evolved, and hence two proportionals of the sulphuric acid become necessary.

The manufacturers who use only one proportion, put the additional water necessary into the receiver. In support of these doctrines Mr Phillips states, that on repeating the Edinburgh process, he obtained only 11.5 parts of a straw colour of sp. gr. 1513, and in another trial 13.4 parts of a high coloured acid of sp. gr. 1534; but Dr Hope, defending the process of his college, states, that he always gets 15 parts of a full orange red colour, and sp. gr. 1520, or even 1540, when the nitre has been previously well dried and the acid boiled; and that the prescribed proportion of sulphuric acid is necessary and sufficient to decompose the nitre, so as to obtain an acid of great strength and free from sulphuric acid.

In confirmation of the due proportion of sulphuric acid and nitre ordered by the Edinburgh College, it may be added, that they are also those of the Parisian Pharmacopœia. Nor do they differ much from these of Süersen, which Bucholz, in his excellent Theory and Practice of Pharmaceutic Chemistry, prefers as the best method of obtaining the strongest fuming nitrous. He says, that from 96 oz. of crystals of nitre and 60.2 of English sulphuric acid, sp. gr. 1.85 to 1.86 *, about 60 oz. of a fine fuming nitric acid, sp. gr. 1.550 to 1.554, are obtained, which is about 8 parts or upwards more than when only 48 parts of acid are used, and the nitric acid is paler. The product is indeed greater, though not so concentrated, when, according to Döbereiner's advice, the sulphuric acid is diluted with one part of water to nine of acid immediately before its addition to the nitre.

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* From Dr Ure's observations upon commercial sulphuric acid, we should suspect that acid of this high specific gravity was impure; but his remark does not apply to that procured by the decomposition of persulphate of iron, which may be got as high as 1.97, containing little, if any, water, which renders the fact mentioned in the text still more adverse to Mr Phillips' doctrine.

The London College, intending that the product should be *nitric* acid, direct us to continue the process only until red fumes appear. Mr Stocker says, that by careful distillation the London proportions afford nine ounces of straw-coloured nitric acid, sp. gr. 1.5404; after which the fumes become deeper red, and the product darker, inclining to orange; but the total product is but slightly coloured, amounts to ten or eleven ounces, and has the sp. gr. required.

As obtained directly by any of these processes, the product is neither nitric nor nitrous acid, but a variable mixture of both. It is more or less high coloured, and emits red fumes; whereas pure nitric acid emits only white fumes.

Sir H. Davy has shewn, that nitrous acid is a compound of nitric acid and nitric oxide; and that, by additional doses of the last constituent, its colour is successively changed from yellow to orange, olive green, and blue green.

Colour.	Nitric Acid.	Nitric Oxide.	Water.	Sp. Gr.
Nitric acid, ...	91.55	——	8.45	1.504
Pale yellow, ...	90.5	1.2	8.3	1.502
Bright yellow, ...	88.94	2.96	8.10	1.500
Dark orange, ...	86.84	5.56	7.6	1.480
Light olive, ...	86.0	6.45	7.55	1.479
Dark olive, ...	85.4	7.1	7.5	1.478
Bright green, ...	84.8	7.76	7.44	1.476
Blue green, ...	84.6	8.	7.4	1.475

But these colours, as Dr Ure properly observes, are not exact indications of the state of the acid, as the addition of water will also change the colour to one lower in the scale.

I may also remark, that the sp. gr. of the acid, according to this table, is less in proportion to the quantity of nitric oxide it contains; which is indeed correct when nitric acid absorbs nitric oxide; but high coloured nitrous acid is easily procured of a higher specific gravity than the strongest nitric. The former has been obtained as high as 1.62 by Proust, and Dr Ure states 1.5 as the greatest strength of the latter; but the most conclusive authority is Meissner, who, in his elaborate work on Areometry, from his own experiments states the sp. gr. of the strongest perfectly colourless nitric acid to be 1.48, and of nitrous acid 1.63. It would appear, that when less than a certain proportion of water is present, the elements of nitric acid have a tendency to separate, and hence it cannot exist above 1.5, except in the state of a high coloured and fuming acid.

Theoretically two proportionals of nitric acid with one of nitric oxide are equivalent to three of nitrous acid. By the application of a gentle heat, the whole of the nitric oxide is vaporized, and pure colourless nitric acid remains in the retort. Hence the Edinburgh College have given a process for converting nitrous into nitric acid, which Dr Powell thinks uneconomical. The nitric oxide carries over with it a portion of the acid, and condenses with it in the receiver, in the form of a very high coloured nitrous acid. Mr Phillips put 150 parts of red nitrous acid, sp. gr. 1522, into a retort; and after the application of heat, 114 of pale nitric acid remained, of sp. gr. 1495; 27 parts of red nitrous acid, of sp. gr. 1598, distilled over, and there was a loss of nine parts.

Liquid nitric acid consists of (ideal) dry nitric acid combined with water, in the proportion nearly of one to two. It is liquid, colourless, and transparent. It is very corrosive, and tinges the skin of a yellow colour. It produces heat when mixed with water, and absorbs water from the atmosphere. Acid of 1.42 rises unaltered at 248° Fahrenheit. Below 1.4 it strengthens by being boiled, and above 1.45 it becomes weaker. It is decomposed by many substances. Light gradually decomposes it, evolving oxygen and nitrous acid gas *. When highly concentrated, it sets fire to oils, to sulphuretted hydrogen gas, to iron-filings, and to zinc, bismuth and tin, when poured on them in a state of fusion. It oxygenizes all the metals, except gold, platinum, and titanium. It consists of five volumes of oxygen, and one of nitrogen. Its saline compounds are called nitrates.

Liquid nitrous acid is of an orange or red colour, exceedingly volatile, and emitting red fumes of an intolerable and suffocating odour. By the addition of water, its colour is successively changed to blue, green and yellow.

Nitrous acid is frequently impure. The presence of sulphuric acid is detected by nitrate of barytes; but before applying this test, the acid must be diluted, as otherwise the salt itself is precipitated in consequence of the acid attracting the water in which it is dissolved. Sulphuric acid is easily got rid of by re-distilling the nitrous acid from a small quan-

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* Nitrous acid gas consists, according to Davy, of two measures of nitric oxide gas, and one of oxygen gas, condensed to half their volume. It has a deep orange colour, disagreeable smell, and sour taste. It reddens litmus paper, and gives a yellow colour to animal substances. 100 cubic inches weigh 64.5 grains, and its specific gravity to hydrogen is 28.6. It is rapidly absorbed by water, which acquires a tint of green, by ether, oil and sulphuric acid.

tity of nitrate of potass, and this rectification forms part of the London process; as, from the large proportion of sulphuric acid used by them, they seem to have anticipated this contamination, which however does not take place, not even, according to Mr Stocker, when the distillation is continued, until the saline mass is brought into a state of fusion. The rectification is therefore unnecessary.

Muriatic acid is detected by the precipitate formed with nitrate of silver, and may be separated by dropping into the nitrous acid a solution of nitrate of silver, as long as it forms any precipitate, and drawing off the nitrous acid by distillation.

ACIDUM NITROSUM DILUTUM. *Ed.*
Diluted Nitrous Acid.

Take of
Nitrous acid,
Water, equal weights.
Mix them, taking care to avoid the noxious vapours.

Dub.

Take of
Nitrous acid,
Distilled water, each one pound.
Mix.

The specific gravity is 1280.

ACIDUM NITRICUM DILUTUM. *Lond.*
Diluted Nitric Acid.

Take of
Nitric acid, one fluidounce;
Distilled water, nine fluidounces.
Mix.

NITROUS acid has a great affinity for water, and attracts it from the atmosphere. During their combination there is an increase of temperature, part of the nitric oxide is dissipated in the form of noxious vapours, and the colour changes successively from orange to green, and to blue, according as the proportion of water is increased. It is to be regretted that the strength of this preparation should have been so much altered by the London College from what it formerly was in their own Pharmacopœia, and still is in those of the other colleges.

The following table shews their comparative strength :

	Strong.	L. dilute.	E. & D.dilute.
Specific gravity,	1.50	1.08	1.28
Weight of floz. in grains,	684	493	584
100 grains contain grains of strong acid,	100	14.3	47.6
—— saturate grains of subcarbonate of soda,	212	30.3	108.5

Table of Diluted Nitric Acids, abridged from Dr Ure.

Sp. Gr.	Liq. Acid in 100.	Dry Acid in 100.	Sp. Gr.	Liq. Acid in 100.	Dry Acid in 100.
15000	100	79.700	12826	48	38.256
14880	95	75.715	12765	47	37.459
14730	90	71.730	12644	45	35.865
14570	85	67.745	12341	40	31.880
14385	80	68.760	12019	35	27.890
14189	75	59.775	11709	30	23,900
13978	70	55.790	11403	25	19.925
13732	65	51.805	11109	20	15.940
13477	60	47.820	10821	15	11.955
13376	58	46.226	10764	14	11.158
13216	55	43.835	10540	10	7.970
12947	50	39.850	10267	5	3.985

Pharmaceutic use.—These acids, the nitrous and nitric, have been long employed as powerful pharmaceutic agents, in their concentrated and diluted state.

Nitric acid is employed in the preparation of dilute nitric acid, nitrate of silver, solution of alkaline iron, ointment of nitrate of mercury, ointment of red oxide of mercury, nitrous ether, and spirit of nitrous ether.

Medical use.—The use of nitric acid in medicine has been considerably extended of late. In the state of vapour they have been used to destroy contagion in gaols, hospitals, ships, and other places where the accumulation of animal effluvia is not easily avoided. The fumigating such places with the vapour of nitrous acid has certainly been attended with success; but that success has often been ascribed entirely to the ventilation employed at the same time. Ventilation may unquestionably be carried so far, that the contagious miasmata may be diluted to such a degree that they shall not act on the body; but to us it appears no less certain, that these miasmata cannot come in contact with nitric acid or oxymuriatic acid vapour, without being entirely decomposed and completely destroyed. Fumigation is, besides, applicable in situations which do not admit of sufficient ventilation; and in all cases, the previous diffusion of acid vapours is an excellent check upon the indolence and inattention of servants and nurses, as by the smell we are enabled to judge whether they have been sufficiently attentive to the succeeding ventilation. Nitric acid vapour, also, is not deleterious to life, and may be diffused in the apartments of the sick without occasioning to them any material inconvenience. The means of diffusing it are easy. Half an ounce of powdered nitre is put into a saucer, which is placed in a pipkin of heated sand. On the nitre two drachms of sulphuric acid are then poured. The fumes of nitric acid immediately begin to rise. This quantity will fill with vapour a cube of ten feet; and by employing a sufficient number of pipkins, the fumes may be easily made to fill a ward of any extent. For introducing this practice, Dr Carmichael Smyth received from the British Parliament a reward of five thousand pounds.

The internal use of these acids has also been lately much extended. In febrile diseases, water acidulated with them forms one of the best antiphlogistic and antiseptic drinks we are acquainted with. Hoffman and Eberhard long ago employed it with very great success in malignant and petechial fevers; and in the low typhus, which frequently rages among the poor in the suburbs of Edinburgh, I have repeatedly given it with unequivocal advantage. In the liver complaint of the East Indies, and in syphilis, nitric acid has also been extolled as a valuable remedy by Dr Scott; and the evident benefits resulting from its use in these complaints has given rise to a theory, that mercury only acts by oxygenizing the system. It is certain that both the primary and secondary symptoms of syphilis have been removed during the use of these acids, and that the former symptoms have not returned, or been followed by any secondary symptoms. But in many instances they have failed; and it is doubted if they ever effected a permanent cure after the secondary symptoms appeared. Upon the whole, the opinions of Mr Pearson on this subject, agitated with so much keenness, appear to us so candid and judicious, that we shall insert them here. He does not think it eligible to rely on the nitrous acid in the treatment of any one form of the lues venerea; at the same time, he by no means wishes to see it exploded as a medicine altogether useless in that disease. When an impaired state of the constitution renders the introduction of mercury into the system inconvenient, or evidently improper, the nitrous acid will be found, he thinks, capable of restraining the progress of the disease, while, at the same time, it will improve the health and strength of the patient. On some occasions, this acid may be given in conjunction with a mercurial course, and it will be found to support the tone of the stomach, to determine powerfully to the kidneys, and to counteract, in no inconsiderable degree, the effects of mercury on the mouth and fauces. Nitrous acid has been applied externally as a vesicatory in desperate cases of East India cholera, and to destroy morbid bone, and even to remove very thick crust in porrigo.

ACIDUM MURIATICUM. *Ed.*
Muriatic Acid.

Take of
  Muriate of soda, previously heated to redness,
  Sulphuric acid,
  Water, of each two pounds.

Mix the acid with eight ounces of the water, and when the mixture has cooled pour it on the muriate of soda in a glass retort. Then having fitted on a receiver containing the rest of the water, distil in a sand-bath, with a gentle heat. In a short time lute the vessels together, and distil to dryness.

The specific gravity of this muriatic acid is to that of distilled water as 1170 to 1000.

Lond.

Take of
  Dried muriate of soda, two pounds;
  Sulphuric acid, *by weight*, twenty ounces;
  Distilled water, a pint and a half.

First mix the acid with half a pint of the water in a glass-retort, and add to the mixture, after it has cooled, the muriate of soda. Pour the rest of the water into the receiver; then having fitted on the retort, distil the muriatic acid over into this water, with the heat of a sand-bath gradually increased until the retort become red.

The specific gravity of this acid is to that of distilled water as 1160 to 1000.

One hundred grains of this acid saturate 124 of crystallized subcarbonate of soda.

Dub.

Take of

Muriate of soda, dried,
Sulphuric acid,
Water, each six pounds.

Add the acid, diluted with the water, after the mixture has cooled, gradually to the salt, in a glass retort, and then distil the liquor until the residuum become dry.

The specific gravity of this acid is 1170.

According to the old doctrine sea salt consisted of muriatic acid and soda, and in this process the sulphuric acid merely dislodged the muriatic by its superior affinity to the soda. But the present doctrine considers sea salt as composed of chlorine and sodium, and explains the process by assuming that, by the strong affinity of the sulphuric acid to soda, water is decomposed; the oxygen uniting with the sodium to form soda, and the hydrogen with the chlorine to form muriatic acid. But as muriatic acid is a permanently elastic fluid [*], the addition of the water is absolutely necessary for its existence in a fluid form. The London and Edinburgh Colleges put a portion of water into the receiver, for the purpose of absorbing the muriatic acid gas, which is first disengaged, and would otherwise be lost for want of water to condense it: the Dublin College, however, orders the whole of the water to be previously mixed with the sulphuric acid. It is indispensably necessary that the mixture of acid and water be allowed to cool before it be added to the salt; for the heat produced is so great, that it would not only endanger the breaking of the retort, but occasion considerable loss and inconvenience, by the sudden disengagement of muriatic acid gas. Dr Powell thinks it is an improvement to add the salt to the diluted acid, but it is less convenient.

The muriate of soda, which should be of the kind called Bay salt, is directed by the Edinburgh College to be heated to redness, before it be introduced into the retort, not to expel the water of crystallization as formerly stated, for it contains none, but because the product is less coloured. The London and Dublin College use the salt merely dried, but it is not enough.

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[*] Hydrochloric or muriatic acid gas is transparent and colourless. It destroys life, and extinguishes flame. 100 cubic inches weigh about 38.8 grains; or its sp. gr. is 17.25, hydrogen gas being unity. According to Sir H. Davy, it consists of equal volumes of chlorine and hydrogen gas. It decomposes alcohol and oil, and destroys putrid exhalations. Water is capable of absorbing about an equal weight of the gas. Its specific gravity is then 1.21; the solution is generally of a pale yellow colour, is very volatile, and emits white fumes of a peculiar unpleasant odour.

The charge should not occupy more than half the body of the retort; and if a common retort and receiver be employed for this distillation, they must not be luted perfectly close; for if any portion of the gas should not be absorbed by the water employed, it must be allowed to escape; but the process will be performed with greater economy, and perfect safety, in a Woulfe's, or some similar apparatus. The muriatic acid gas, on its condensation, gives out, according to Dr Powell, a considerable heat, so that it is necessary to keep the receiver cooled during the process.

The residuum in the retort consists principally of sulphate of soda, which may be purified by solution and crystallization; and to save the retort, Dr Powell directs it to be filled with boiling water, after the process is over, and it has cooled down to 212°.

Mr Phillips, in commenting upon the Edinburgh Pharmacopœia, stated, that by Dr Wollaston's scale, the requisite proportions should be 84 parts of sulphuric acid to 100 of common salt. Dr Hope replied, that from experience he was certain that the equal quantities directed by the Pharmacopœia gave a larger product of muriatic acid, in a shorter period, and at a less expense of fuel; and he explained the result by the tendency which sulphuric acid has to form a supersulphate of soda. Mr Phillips afterwards found that Dr Hope was correct as to the fact, although he still rejected the explanation, as 16.8 instead of 10 of sulphuric acid are necessary to form a bisulphate with the soda. His experimental results were, that when equal quantities were used, 1-7th part of the salt remained undecomposed.

If properly prepared, the muriatic acid is perfectly colourless; but in the shops it is very seldom found pure. It almost always contains iron, and very frequently sulphuric acid or copper. The copper is detected by the blue colour produced by supersaturating the acid with ammonia, the iron by the black or blue precipitate formed with tincture of galls or prussiate of potass. The sulphuric acid may be easily got rid of by redistilling the acid from a small quantity of dried muriate of soda. But Mr Hume discovered, that muriate of baryta is precipitated when poured into pure muriatic acid, from the acid attracting the water of the salt. It is therefore necessary to dilute it before testing it.

ACIDUM MURIATICUM DILUTUM. *Dub.*
Diluted Muriatic Acid.

Take of
Muriatic acid,
Distilled water, each one pound. Mix.
The specific gravity is 1080.

THIS diluted acid, of a fixed strength, is convenient for apportioning its dose; and as it is now introduced by the Dublin College, it is to be hoped that the same proportions will be adhered to by the others.

Table of the Quantity of Acid of 1.2 *Muriatic Acid Gas and Chlorine in* 100 *parts of Liquid Muriatic Acid, abridged from Dr Ure.*

Sp. Gr.	Liquid Acid.	Acid Gas.	Chlorine.	Sp. Gr.	Liquid Acid.	Acid Gas.	Chlorine.
1.2000	100	40.777	39.675	1.1102	55	21.822	22.426
1.1910	95	38.738	37.692	1.1000	50	20.388	19.837
1.1822	90	36.700	35.707	1.0899	45	18.348	17.854
1.1721	85	34.660	33.724	1.0798	40	16.310	15.870
1.1701	84	34.252	33.328	1.0697	35	14.271	13.887
1.1620	80	32.621	31.746	1.0597	30	12.233	11.903
1.1599	79	32.213	31.343	1.0497	25	10.194	9.919
1.1515	75	30.582	29.757	1.0397	20	8.155	7.935
1.1410	70	28.544	27.772	1.0298	15	6.116	5.951
1.1308	65	26.504	25.789	1.0200	10	4.078	3.968
1.1206	60	24.466	23.805	1.0100	5	2.039	1.984

Table of the Quantity of Muriatic Acid Gas in 100 *parts of its solution in water of different Specific Gravities, at* 45° *Fahr. and Barometer* 30. *Sir H. Davy.*

1.21	contain	42.43	1.10	contain	20.20
1.20	———	40.80	1.09	———	18.18
1.19	———	38.38	1.08	———	16.16
1.18	———	36.36	1.07	———	14.14
1.17	———	34.34	1.06	———	12.12
1.16	———	32.32	1.05	———	10.10
1.15	———	30.30	1.04	———	8.08
1.14	———	28.28	1.03	———	6.06
1.13	———	26.26	1.02	———	4.04
1.12	———	24.24	1.01	———	2.02
1.11	———	22.32			

Pharm. use.—Muriatic acid is employed to prepare dilute muriatic acid, muriate of baryta, solution of muriate of lime, tincture of muriate of iron and hydrosulphuret of ammonia. It is incompatible with the officinal alkalies, earths, and their combinations with carbonic and the vegetable acids, and with most of the metallic sulphurets, oxides, and their combinations with weak acids, and especially with the salts of silver and lead.

Medical use.—In its effects on the animal economy, and the mode of its employment, it coincides with the acids already mentioned, which almost proves that they do not act by oxygenizing the system. On the contrary, according to Sir H. Davy's view of its constitution, it contains no oxygen, and can only act *chemically* by imparting chlorine or hydrogen to the system, or withdrawing from it oxygen or some other principle which has an affinity for chlorine or hydrogen.

AQUA ALCALINA OXYMURIATICA. *Dub.*
Oxymuriatic Alkaline Water.

Take of
  Dried muriate of soda, two pounds;
  Manganese, in powder, one pound;
  Water,
  Sulphuric acid, each two pounds.

Mix the muriate of soda and manganese; put them into a matrass, and pour on the water. Then, by means of a proper apparatus, add the sulphuric acid gradually, and at different times, and pass the gas thus extricated through a solution of four ounces of carbonate of kali, in twenty-nine ounces, by measure, of water. Towards the end of the operation, heat the matrass moderately.

The specific gravity is 1087.

THIS was formerly considered as a solution of the oxygenated muriate of potass; the oxymuriatic acid is disengaged in the matrass, by the action of the sulphuric acid on the muriate of soda, and black oxide of manganese, which latter furnishes the additional dose of oxygen to the muriatic acid, disengaged from the former; and the oxymuriatic acid gas thus formed readily combines with the potass of the solution of the alkaline salt, through which it is made to pass, while the carbonic acid is expelled.

But, according to the present doctrine, it is a mixed solution of the chlorate and muriate of potassa, and the process is thus explained. The substance here called Manganese is its tritoxide, and consists of metallic manganese 3.5, and oxygen 2 = 5.5; the deutoxide contains $1\frac{1}{2}$, and protoxide 1 oxygen; but the additional doses of oxygen are very loosely attached, and may be separated by heat, or by affinities. In the process under examination, the sulphuric acid acts at the same time upon the muriate of soda, forming sulphate of soda and disengaging muriatic acid, and upon the tritoxide of manganese, forming a sulphate with the protoxide and disengaging oxygen; but the oxygen and muriatic acid thus presented to each other in their nascent state react upon each other; the oxygen combines with the hydrogen of the muriatic acid, and chlorine * is evolved.

In the second part of the process the chlorine is transmitted through a solution of subcarbonate of potass. As soon as the chlorine comes in contact with the potass, water is decomposed, and its hydrogen and oxygen divide the chlorine between them, and form two acids, the muriatic and chloric, which unite with the potass, and form muriate and chlorate of potass. At first these changes take place quietly, but gradually the fluid becomes slightly opalescent, owing to the separation of silica with which the alkali is contaminated, and an effervescence takes place, owing to the separation of the carbonic acid, when the acids, having saturated the free alkali, act upon the carbonate. The cessation of the effervescence shews the saturation to be complete.

The Dublin College intend the solution to be so weak, that no crystallization shall take place in it, and, as already stated, it is a mixed solution of chlorate and muriate of potass. But if the alkaline solution be more concentrated, then gradually brilliant tabular crystals of chlorate of potass are formed, and the muriate of potass remains in solution; and in this way great quantities of the chlorate of potass are now manufactured, which have completely superseded the mixed solution for medical as well as other purposes.

By the old doctrine it was supposed that, in this second part of the process, the oxymuriatic acid, as soon as it came in contact with the potass, was converted into muriatic and hyperoxymuriatic acid by the whole excess of oxygen quit-

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* Chlorine, Sir H. Davy, (oxymuriatic acid gas of former chemists,) is of a yellowish-green colour, has an extremely disagreeable smell, 100 cubical inches weigh 75.375 grains, its specific gravity to hydrogen being 33.5 to 1; to air 2.495; is irrespirable, but supports combustion. It is not changed by heat or cold, or electricity; and when perfectly dry does not act on vegetable colours; but they are quickly destroyed by it when vapour or moisture is present. Water at 60° absorbs about double its volume, weighs 1.003, freezes at 40°, and acquires a strong acrid taste, and disagreeable smell.

ting one portion of the muriatic acid to combine with the other.

Med. use.—Oxymuriate of potass in solution was at one time strongly recommended as an antisyphilitic remedy, and its use was extended to other cutaneous diseases, and finally to fever and spasmodic diseases, as a general stimulant. It was given in the dose of from three to ten grains, four times a-day, gradually increasing to 25 or 30. At the time, many singular cures thought to be performed by means of it were recorded; but it has fallen into disuse, and we do not now hear of its employment, although its introduction into the Dublin Pharmacopœia would lead us to presume that it is still used in Ireland. It sometimes acted as a diuretic, always as a stimulant; and it is singular, that in some cases, in which it produced little or no effect, it passed off by the urine undecomposed. In these cases Mr Cruickshank proposed to remedy the defect, by giving, after each dose, 10 or 15 drops of muriatic acid.

AQUA OXYMURIATICA. *Dub.*
Oxymuriatic Water,

Is prepared by transmitting, in a proper apparatus, the superfluous gas of the preceding process (the process for preparing *aqua alcalina oxymuriatica*) through a pint of water. The specific gravity is 1003.

CHLORINE was also, when the chemical pathology was fashionable, recommended as an antisyphilitic remedy, and water impregnated with it certainly seemed, in some instances, to effect a cure; but it has since been laid aside. Mr Braithwaite also recommended it strongly in scarlatina. He gave, according to the age of the patient, from half a drachm to a drachm, in the course of the day, mixed with eight ounces of distilled water; but it is advisable to keep it divided into doses, in different phials, as it loses every time the phial is opened, and it should be kept in a dark place. Dr Willan confirms its use in cynanche maligna.

The vapours of this powerful chemical agent have been recommended by Morveau as the best means of destroying contagion; and when properly managed may be even inhaled without much inconvenience. They are easily disengaged by mixing together ten parts of muriate of soda, and two parts of black oxide of manganese in powder, and pouring upon the mixture, first four parts of water, and then six parts of sulphuric acid. Fumes of chlorine immediately arise.

Morveau has since contrived what he calls Dis-infecting or Preservative phials. If intended to be portable, 46 grains of black oxide of manganese, in coarse powder, are to be put into a strong glass phial, of about $2\frac{1}{3}$ cubic inches capacity, with an accurately ground stopper, to which must be added about $\frac{45}{100}$ of a cubic inch of nitric acid of 1.4 specific gravity, and an equal bulk of muriatic acid of 1.134; the stopper is then to be replaced, and the whole secured by inclosing the phial in a strong wooden case, with a cap which screws down so as to keep the stopper in its place. They are used by simply opening the phial without approaching it to the nose, and shutting it as soon as the smell of the chlorine is perceived. A phial of this kind, if properly prepared, will preserve its power during many years. For small wards, strong bottles, with ground stoppers an inch in diameter, of about 25 or 27 cubic inches of capacity, may be used, with 372 grains of the oxide, and 3.5 inches of each of the acids, and the stopper kept in its place by leaden weights; or for larger wards, very strong glass jars, about 43 cubic inches in capacity, containing an ounce of the oxide, and 6 inches of each of the acids. These jars are to be covered with a plate of glass, adjusted to them by grinding with emery, and kept in its place by a screw. In no case is the mixture to occupy more than one-third of the vessel.

ACIDUM ACETICUM TENUE. *Ed.*

Weak Acetic Acid.

Let eight pounds of vinegar be distilled in glass vessels, with a gentle heat. The first pound which comes over in a sand bath, as being too watery, is to be set aside; the next five pounds are the Weak Acetic Acid. Continue the distillation as long as the acid is obtained colourless. But this last portion, as being too empyreumatic, and not fit for internal use, is to be mixed with the pound first obtained, and may be employed for various chemical purposes.

ACETUM DISTILLATUM. *Dub.*

Distilled Vinegar.

Take of
Vinegar, ten pints.

Draw off, with a gentle heat, six pints.

Glass vessels are to be employed in this distillation, and the first pint which comes over is to be rejected.

The specific gravity of this acid is 1006.

ACIDUM ACETICUM. *Lond.*
Acetic Acid.

Take of
Vinegar, a gallon.
Distil off the acetic acid in a sand bath, from a glass retort, into a cooled glass receiver; then having thrown away the first pint, preserve the next six.

THE purification of vinegar by distillation is now almost superseded by the manufacture of the pyrolignic acid; one pound of which, of sp. gr. 1.043, mixed with four pounds of water, give a dilute acid of 1.009, which is always substituted for distilled vinegar.

By distillation vinegar loses its agreeable flavour, and becomes considerably weaker; for the spirit and water, being rather more volatile than acetic acid, come over first, while the last and strongest portion of the acid cannot be obtained free from empyreuma.

Distilled vinegar should be colourless and transparent, specific gravity from 1.007 to 1.0095, have a pungent smell, and purely acid taste, totally free from acrimony and empyreuma, and should be entirely volatile. One fluidounce should dissolve at least 13 grains of white marble, according to Dr Powell, or 100 grains should neutralize 14.5 grains of crystallized subcarbonate of soda. Distilled vinegar should not form a precipitate on the addition of a solution of baryta, or of water saturated with sulphuretted hydrogen; or change its colour when supersaturated with ammonia. These circumstances shew, that it is adulterated with sulphuric acid, or contains lead, copper, or tin.

Pharm. use.—To prepare the acetates of potass, iron and lead; the solutions of the acetate of ammonia, and of the subacetate of lead; oxymel simple and of colchicum, vinegar of squill and of colchicum, and the ammoniac plaster.

Med. use.—Distilled acetic acid, in its effects on the animal economy, does not differ from vinegar; and as it is less pleasant to the taste, it is only used for pharmaceutical preparations.

ACIDUM ACETICUM. *Dub.*
Acetic Acid.

Take of
Acetate of kali, six ounces;
Sulphuric acid, three ounces, by weight.
Pour the acid into a tubulated retort, and gradually add the acetated kali in different portions, waiting, after every ad-

dition, until the mixture cools; then distil off the acid, with a moderate heat, until the residuum become dry. The specific gravity of this acid is 1070.

ACIDUM ACETICUM FORTE. *Ed.*
Strong Acetic Acid.

Take of
Sulphate of iron dried, one pound;
Acetate of lead, ten ounces.

Having rubbed them together, put them into a retort, and distil in a sand-bath, with a moderate heat, as long as any acid comes over.

MANY different processes have been proposed for preparing strong acetic acid, but they may be arranged in three classes. It may be prepared,

1. By decomposing metalline acetates by heat.
2. ——————— acetates by sulphuric acid.
3. ——————— acetates by sulphates.

A process of the first kind was inserted in a former edition of the London College; but the heat necessary for decomposing verdigris is so great, that it decomposes part of the acetic acid itself, and gives the product an empyreumatic and unpleasant smell.

By the superior affinity of sulphuric acid, the acid may be easily expelled from every acetate, whether alkaline or metallic; but part of the sulphuric acid seems to be deprived of its oxygen, and to be converted into sulphurous acid, which renders the product impure. This is said to be the process of the manufacturers of pyrolignic acid, who decompose acetate of lime by sulphuric acid.

The process of the Edinburgh College belongs to the last class. It was first proposed by C. Badollier, apothecary at Chartres. Mr Lowitz directs one part of carefully dried acetate of soda to be triturated with three parts of supersulphate of potass, and the distillation to be conducted in a glass retort, with a gentle heat. The Berlin College mix together twelve ounces of sulphate of potass with six of sulphuric acid, diluted with eighteen of water, and evaporate to dryness. With the supersulphate of potass, thus prepared, they decompose nine ounces of acetate of soda, dried with a gentle heat *.

Pharm. use.—To prepare camphorated acetic acid, and the acetates of lead and of potass.

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* The acid residuum of the distillation of nitrous acid would be a very economical substitute.

Medical use.—It is almost solely used as an analeptic remedy in syncope, asphyxia, hysteric affections, and headachs. Applied to the skin, it acts as a stimulant, rubefacient, or vesicatory, but it is most frequently snuffed up the nostrils in the state of vapour.

ACIDUM BENZOICUM. *Ed.*
Benzoic Acid.

Take of
  Benzoin, twenty-four ounces;
  Subcarbonate of soda, eight ounces;
  Water, sixteen pounds.

Triturate the benzoin with the subcarbonate, then boil in the water for half an hour, with constant agitation, and strain. Boil what remains of the balsam with other six pounds of water, and strain. Mix these decoctions, and evaporate, until two pounds remain. Filter anew, and drop into the fluid, as long as it produces any precipitation,
    Dilute sulphuric acid.

Dissolve the precipitated benzoic acid in boiling water, strain the boiling solution through linen, and set it aside to crystallize. Wash the crystals obtained with cold water, dry and preserve them.

Lond.

Take of
  Benzoin, one pound.

Put the benzoin into a glass vessel set in a sand bath, apply a heat of 300°, and gradually increase it till nothing more arise. Wrap the sublimate in bibulous paper, and compress it to separate the oil; lastly, sublime it a second time, with a heat not exceeding 400°.

Dub.

Take of
  Benzoin, any quantity.

Liquefy it in a retort with a wide throat, having a receiver fitted to it, but not luted, and sublime. Remove the sublimed matter occasionally from the neck of the retort, lest it accumulate in too great a quantity. If it be soiled with oil, press it, folded up in blotting paper, and repeat the sublimation.

THE distinguishing character of balsams is their containing benzoic acid, which may be separated from the resin, their other principal constituent, either by simple solution in water, sublimation, or by combining it with a salifiable base. The London and Dublin Colleges direct it to be done in the second way. But, even with the greatest care, it is almost impossible to manage the heat so as not to decompose part of the resin, and thus give rise to the formation of an empyreumatic oil, which contaminates the product. Nor can it be freed completely from the empyreumatic oil by bibulous paper. It is however the least troublesome and most advantageous process.

The other method of separating benzoic acid from resin was first practised by Scheele, who employed lime water; Göttling afterwards used carbonate of potass; and, lastly, Gren used carbonate of soda, which has been adopted by the Berlin College, and now by that of Edinburgh. Mr Brande, in experiments which he made for the purpose of ascertaining the comparative value of the different processes, obtained from one pound of benzoin,

	Grains.
By sublimation,	960
— Scheele's process,	899
— Gren's and Göttling's process,	810
— boiling benzoin in water,	490

Benzoic acid is obtained by sublimation in white feathery crystals, soft and elastic, not pulverizable; by crystallization in flat, oblique, transparent prisms: when pure it is almost inodorous, and has an acrid, slightly acid taste. It is fusible, and evaporates by heat, for the most part, without change. It is also inflammable, and burns entirely away. It is permanent in the air. It is very sparingly soluble in cold water; but at 212° it dissolves in about 24 waters. It is also soluble in hot acetic acid. It is soluble, without change, in alcohol, in concentrated sulphuric and nitric acid, and is separated from them by water.

Pharm. use.—It enters into the compound tincture of camphor and ammoniated tincture of opium.

ACIDUM CITRICUM. *Lond.*
Citric Acid.

THIS process has already been introduced, under the head of ACIDUM CITRICUM, in the Materia Medica, p. 190.

ACIDUM TARTARICUM. *Lond.*
Tartaric Acid.

Take of

Supertartrate of potass, two pounds and a half;

Boiling distilled water, three gallons;
Prepared chalk, a pound;
Sulphuric acid, a pound.

Boil the supertartrate of potass with two gallons of the water; and gradually add the prepared chalk until no more bubbles arise; set the mixture aside that the tartrate of lime may subside; pour off the supernatant fluid, and wash the tartrate of lime repeatedly with distilled water, until it come away tasteless. Then pour on the sulphuric acid diluted with a gallon of the distilled water, set aside for twenty-four hours, stirring it occasionally. Filter the liquor, and evaporate in a water-bath, so as to form crystals.

In the first part of this process the lime combines with the excess of tartaric acid. Tartrate of lime is deposited, tartrate of potass remains in solution, and the carbonic acid is evolved, producing effervescence. In the second part of the process the tartrate of lime having been thoroughly washed, and freed from all foreign matters, is decomposed by the sulphuric acid, which forms insoluble sulphate of lime; and the tartaric acid, set free, remains dissolved in the water, from which it is readily obtained by crystallization.

The crystals of tartaric acid are of considerable size, permanent, soluble in five waters at 60°, more soluble at 212°, without smell or colour, and very acid to the taste; act upon metals which decompose water, and combine with the alkalies and most of the earths and oxides. Its solution in water becomes mouldy; and the dry acid, when exposed to heat, is partly decomposed and sublimed in the state of pyrotartaric acid. It decomposes the salts of potass, forming with them bitartrate, and produces insoluble precipitates in solutions of lime and lead.

Med. use.—It is now very much employed in the composition of all the various effervescing powders. The white papers in what are called soda powders contain *tartaric acid;* the blue *bicarbonate of potass.*

OLEUM SUCCINI et ACIDUM SUCCINICUM. *Ed.*
Oil of Amber and *Succinic Acid.*

Take of

Amber reduced to powder, and of pure sand, equal parts.

Mix them, and put them into a glass retort, of which the mixture fills one half; then adapt a large receiver, and distil in a sand bath, with a fire gradually increased. At first, a watery liquor will come over, with a little yellow oil; then a yellow oil, with an acid salt; and, lastly, a reddish and dark coloured oil. Pour the liquor out of the receiver, and separate the oil from the water.

Press the succinic acid collected from the neck of the retort and sides of the receiver between folds of blotting paper, to free it from the oil adhering to it; then purify it by solution in warm water and crystallization.

ACIDUM SUCCINICUM. *Dub.*
Succinic Acid.

Take of
Amber,
Pure sand, each one pound.

Distil, with a heat gradually increased, an acid liquor, an oil, and a salt discoloured with oil. Let the salt be wrapt up in blotting paper, and compressed, to squeeze out the oil, and be again sublimed.

WE are not acquainted with any experiments which determine whether the succinic acid exist as such in the amber, or whether it be a product of the decomposition of the amber by the action of heat; for in the process employed for obtaining succinic acid the amber is completely decomposed.

The sand is added to prevent the amber from running together into masses, and impeding the distillation; but as it renders the residuum unfit for the use of the varnisher, it is not advisable. According to Göttling, this distillation should be performed in a tubulated iron or earthen-ware retort, exposed to the immediate action of the fire; for he says, that a glass retort is incapable of supporting the necessary temperature.

Besides the succinic acid collected from the neck of the retort, and sides of the receiver, the oil washes down a portion of it into the receiver, and the watery liquor which comes over is saturated with it. But the whole of it may be obtained by agitating the oil with some boiling water, which will dissolve the acid. This solution is then to be added to the acid liquor, and the acid they contain is easily obtained by evaporation and crystallization. The acid may afterwards be purified by solution in boiling water and crystallization, according to the directions of the colleges.

But even after repeated solutions and crystallizations, a portion of empyreumatic oil still adheres to the acid, and renders it impure.

Succinic acid, although retained in the Edinburgh and Dublin Pharmacopœias, is never used in medicine. It has been rejected from the London.

CHAP. III.—ALKALIES, AND ALKALINE SALTS.

AQUA POTASSÆ. *Ed.*
Solution of Potass.

Take of
- Newly prepared lime, eight ounces;
- Carbonate of potass, six ounces;
- Boiling water, twenty-eight ounces.

Pour upon the lime in an iron or earthen vessel twenty ounces of the water. After the ebullition is finished, instantly add the salt dissolved in eight ounces of the water; and having thoroughly mixed the whole, cover the vessel till they cool. When the mixture has cooled, agitate it well, and pour it into a glass funnel, the throat of which is obstructed with a piece of clean linen. Cover the upper orifice of the funnel, and insert its tube into another glass vessel, so that the Solution of Potass may gradually drop through the rag into the lower vessel. As soon as it ceases to drop, pour into the funnel some ounces of water, but cautiously, so that it may swim above the matter in the funnel. The Solution of Potass will again begin to drop, and the affusion of water is to be repeated in the same manner, until three pounds have dropped, which will happen in the space of two or three days; then mix the superior and inferior parts of the liquor together by agitation, and keep it in a well-stopped phial.

LIQUOR POTASSÆ. *Lond.*
Solution of Potass.

Take of
- Subcarbonate of potass, one pound;
- Fresh quicklime, half a pound;
- Distilled water, boiling, a gallon.

Dissolve the potass in two pints of the water; add the rest of the water to the lime. Mix the liquors while hot, set the mixture aside in a covered vessel; and after it has cooled, filter it through cotton cloth.

If any diluted acid, dropped into it, excite effervescence, more lime must be added, and the filtration repeated.

A pint of this liquor should weigh sixteen ounces.

AQUA KALI CAUSTICI. *Dub.*
Solution of Caustic Kali.

Take of

Fresh burnt lime, eight ounces;
Subcarbonate of kali, six ounces.

Put the lime into an earthen vessel, and sprinkle upon it two pints of boiling water. With the slaked lime mix the salt, and cover the vessel. Pour the mass, as soon as it has cooled, into a glass funnel, whose throat is obstructed with a rag. Having covered the funnel, let the ley drop into a vessel placed below it, and pour water from time to time into the funnel, until three pints have passed through.

Let the liquor be agitated, and kept in a bottle of green glass well closed.

If the ley be rightly prepared, it will have neither colour nor smell, and will scarcely effervesce when mixed with acids. If it effervesce considerably, add a little fresh burnt lime, in very fine powder; digest for twenty-four hours in a close vessel, with occasional agitation; then filter the ley in the manner already directed.

The specific gravity of this liquor is to that of distilled water as 1100 to 1000.

THESE processes do not differ materially. They are founded upon the affinity of lime being stronger than that of potass for carbonic acid. Therefore, when lime comes in contact with carbonate of potass, the carbonic acid quits the potass to unite with the lime, and the results of the mixture are potass and carbonate of lime. Now, as the carbonate of lime is insoluble in water, and the potass is very soluble, they may be separated by filtration. In doing this, however, we must take care to employ instruments on which the solution of potass does not act, and to prevent the free access of air, from which it would attract carbonic acid, and thus frustrate the whole operation. The latter object is partly attained by covering the upper or broad end of the funnel with a plate of glass, and inserting the lower end into the neck of a phial, which it fits pretty closely. The drawing and description of a more complex funnel for this purpose, suggested to me the use of a funnel, through the throat of which, a tube was passed, rising nearly to the surface of the funnel, and fitting the throat only loosely; and here the filtering material, cotton, lint, or sand is to be placed. The throat of the funnel fits closely a phial to receive the filtered liquor, and the surface of the funnel is covered by a glass plate. By this arrangement, while the fluid drops into the phial below, the air it displaces rises through the tube into the upper part of the funnel, and thus the fluid comes in contact with that small quantity of air only which the phial originally contained. The former object is attended with great difficulty, and indeed scarcely to be effected, so powerful and general is the agency of potass. All animal substances are immediately attacked and destroyed by it; therefore, our filters cannot be made of silk, woollen, or paper which contains glue; and although neither vegetable matters nor silica entirely escape its action, linen, cotton, or sand, are, on the whole, the least objectionable.

A filter of sand was used by Dr Black: he first dropped a rugged pebble into the tube of the funnel, in some part of which it formed itself a firm bed, while the inequalities on its surface afforded interstices of sufficient size for the passage of the filtering liquor. On the upper surface of this pebble he put a thin layer of lint or clean tow; immediately above this, but not in contact with it, he dropped a pebble similar to the former, and of a size proportioned to the swell in the upper part of the tube of the funnel. The interstices between this second pebble and the funnel were filled up with stones of a less dimension, and the gradation uniformly continued till pretty small sand was employed. Finally, this was covered with a layer of coarser sand, and small pebbles, to sustain the weight of the fluid. A filter of sand being thus constructed in the funnel, it was washed perfectly clean, by making clean water pass through it, till it dropped from the lower extremity of the funnel perfectly clear and transparent; and before using it, it was allowed to stand for some days, that no water might remain among the interstices of the sand.

From the spongy nature of the residuum which remains upon the filter, and especially if we use that of sand, a considerable quantity of the solution of potass will be retained. It is, however, easily obtained, by pouring gently over it, so as to disturb it as little as possible, a quantity of water; the ley immediately begins again to drop from the funnel, and as from the difference of their specific gravity, the water does not mix with it, but swims above it, the whole ley passes through before any of the water. By means of the taste we easily learn when the whole ley has passed.

As it is natural to suppose that the strongest solution will pass first, and the weakest last, we are directed to agitate the whole together, to render their strength uniform.

If the solution of potass be pure, it will be clear, without colour or smell, feel soapy, and will neither effervesce with acids, nor form a precipitate with subcarbonate of potass. If it effervesces, carbonic acid is present, and must be separated by again boiling the solution with a little lime, or by dropping it into lime-water, as long as it produces any precipitate. But Mr Phillips has remarked, that even when a small quantity of carbonic acid is contained in it, no precipitate is produced unless a considerable quantity of lime-water be added; and in his late translation of the London Pharmacopœia, he says it is in vain to expect to preserve it so perfect, that lime-water shall occasion no precipitation. If, on the contrary, it contain lime, from too much of it having been employed in the preparation, it may be separated by dropping into the ley a solution of the subcarbonate of potass. When we have thus purified our solution of potass, it must be again filtered, to have it perfectly pure.

On the suggestion of Mr Phillips, the London College in 1817 reduced the quantity of lime one half; but Mr Phillips still thinks the quantity of lime unnecessarily large and inconvenient, by rendering the process tedious; while Dr Hope asserts, that the excess of lime deprives the potassa much more completely of its carbonic acid than a smaller quantity. Even granting that in the hands of so dextrous an experimentalist as Mr Phillips a smaller quantity may succeed, we must remember that the object of the process is to get the alkali as free from carbonic acid as possible.

By calculation, 2.75 of perfect new burnt lime should abstract the carbonic acid of 11 subcarbonate of potass.

Medical use.—The solution of caustic potass, under various names, has at different times been celebrated as a lithontriptic, and as often fallen again into disuse. The very contradictory accounts of its effects as a solvent are now, in some degree, explicable, since it has been discovered that urinary calculi are very different in their natures, so that some of them are only soluble in acids, and others only in alkalies. Of the last description are the calculi of uric acid, which are very frequent, and those of urate of ammonia. On these, therefore, alkalies may be supposed to make some impression; and that alkaline remedies, taken by the mouth, have occasionally relieved calculous complaints, is certain. It is however said, that their continued use debilitates the stomach; and M. Fourcroy has proposed to apply the remedy immediately to the disease, by injecting into the bladder a tepid solution of potass or soda, so dilute that it can be held in the mouth. Before the alkaline solution be injected, the bladder is to be completely evacuated of urine, and washed out with an injection of tepid water. After the alkaline injection has remained in the bladder half an hour or more, it is to be evacuated, and allowed to settle. If, on the addition of a little muriatic acid, a precipitate be formed, we shall have reason to conclude that the calculus contains uric acid, and that the alkali has acted on it.

Very dilute caustic alkaline solutions may also be taken into the stomach as antacids, but we possess others which are preferable.

Mr Brandish has strongly recommended the solution of caustic potash for the cure of scrofula. He prescribes the addition of a drop or two of genuine oil of juniper to the pint of liquor, and orders it to be taken twice a-day in the following doses: To a child from four to six, 1 drachm by measure; from six to eight, one drachm and a half; eight to fifteen, 2 drachms; fifteen to eighteen, two and a half; to adults 3 and sometimes 4. It should however be begun in rather smaller doses. The vehicle may be fresh beer, malt-tea, barley-water, or water-gruel.

Externally, alkaline solutions have been more frequently used, either very dilute, simply as a stimulus, in rickets, gouty swellings, gonorrhœa, and spasmodic diseases, or concentrated as a caustic, to destroy the poison of the viper, and of rabid animals.

POTASSA; olim CAUSTICUM COMMUNE ACERRIMUM. *Ed.*
Potass; formerly *Strongest Common Caustic.*

Take of

The solution of potass, any quantity.

Evaporate it in a covered very clean iron vessel, till, on the ebullition ceasing, the saline matter flow gently like oil, which happens before the vessel becomes red. Then pour it out on a bright iron plate; let it be divided into small pieces before it hardens, and immediately deposited in a well-stopped phial.

Potassa fusa. *Lond.*
Melted Potass.

Take of

Liquor of potass, one gallon.

Evaporate the water in a bright iron vessel over the fire, until after the cessation of the boiling the potass melt. Pour this out upon an iron plate into proper moulds.

Kali causticum. *Dub.*
Caustic Kali.

Take of

Solution of caustic kali, any quantity.

Evaporate it over the fire in a very clean iron vessel, until the ebullition having ceased, the saline matter, on increasing the heat, remain almost at rest in the vessel. Let the liquefied salt be poured out upon an iron-plate, and while it is congealing, be cut into proper pieces, which are immediately to be put into a well-closed phial.

During the evaporation, let the operator avoid the drops spirted up.

The principal thing to be attended to in this operation, is to conduct the evaporation so rapidly that the ley shall not absorb any carbonic acid from the atmosphere. As long as any water of solution remains, the ebullition is evident, and the evaporation is to be continued until it cease. The heat is then to be increased a little, which renders the potass perfectly fluid, and gives it the appearance of an oil, when it is ready to be poured out, either on a polished plate, as directed by the colleges, or into iron moulds, such as are used for the melted nitrate of silver.

Medical use.—Potass is only used as a caustic, or to form solutions of a known strength; and even its use as a caustic is inconvenient, from its being so quickly affected by the air, and from its rapid deliquescence, which renders it apt to spread.

Potassa cum calce; *olim* Causticum commune mitius. *Ed.*
Potass with Lime; formerly *Milder Common Caustic.*

Take of

Solution of potass, any quantity.

Evaporate it in a covered iron vessel till one-third remains; then mix it with as much new slaked and powdered lime as will bring it to the consistence of pretty solid pap, which is to be kept in a vessel closely stopped.

Lond.

Take of
Liquor of potass, three pints;
Fresh quick lime, one pound.
Boil down the liquor to one pint, then add the lime previously slaked, and mix them intimately.

KALI CAUSTICUM CUM CALCE. *Dub.*
Caustic Kali with Lime.

Evaporate solution of caustic kali to one-third, then add as much fresh burnt lime, in powder, as will form a sufficiently thick mass, which is to be kept in a well-closed vessel.

THE addition of the lime in these preparations renders hem less apt to deliquesce, more easily managed as a causic, and milder in their operation than fused potass.

SUBCARBONAS POTASSÆ. *Ed.*
Subcarbonate of Potass.

Let impure subcarbonate of potass be heated red hot in a crucible. Triturate it with an equal weight of water, after the fæces have subsided, pour the liquor into a very clean iron pot, and boil to dryness, stirring assiduously towards the end of the process, to prevent it sticking to the vessel.

SUBCARBONAS KALI. *Dub.*
Subcarbonate of Kali.

Take of
Potashes in coarse powder,
Cold water, each six pounds.
Mix them by trituration, and macerate them for a week in a wide vessel, with occasional agitation. Filter the ley, and evaporate it to dryness, in a very clean iron vessel. Towards the end of the evaporation, stir the saline mass constantly with an iron spatula. When thus reduced to coarse powder, keep it in close vessels.

Before the ashes are dissolved in the water, if they be not sufficiently pure, roast them in a crucible till they become white.

POTASSÆ SUBCARBONAS. *Lond.*
Subcarbonate of Potass.

Take of
Impure potashes, in powder, three pounds;
Boiling water, three pints and a half.
Dissolve the potashes in the water, and filter, then pour it in-

to a bright iron vessel, and evaporate the water by a gentle heat until the liquor become thick; then, having removed it from the fire, stir it constantly with an iron spatula until the salt become granulated.

A subcarbonate of potass may be prepared in the same manner from Tartar, previously burnt till it becomes of an ash colour.

SUBCARBONAS POTASSÆ PURISSIMUS. *Ed.*
Pure Subcarbonate of Potass.

Take of

Impure supertartrate of potass, any quantity.

Wrap it up in moist bibulous paper, or put it into a crucible, and burn it into a black mass, by placing it among live coals. Having reduced this mass to powder, expose it in an open crucible to the action of a moderate fire till it become white, or at least of an ash-grey colour, taking care that it do not melt. Then dissolve it in warm water; strain the liquor through a linen cloth, and evaporate it in a clean iron vessel, diligently stirring it, towards the end of the process, with an iron spatula, to prevent it from sticking to the bottom of the vessel. A very white salt will remain, which is to be left a little longer on the fire, till the bottom of the vessel becomes almost red. Lastly, when the salt is grown cold, keep it in glass vessels, well stopped.

KALI E TARTARO. *Dub.*
Kali from Tartar.

Take of

Crystals of tartar, any quantity.

Heat them to redness in a silver crucible, loosely covered, until they cease to emit fumes. Reduce the mass which remains, to coarse powder, and roast it for two hours in the same crucible, uncovered, stirring it frequently. Boil this in twice its weight of water, for a quarter of an hour, and after the liquor has become pure, pour it off. Repeat this three times.

Filter the mixed leys, and evaporate them in a silver bason.

While the salt which remains is drying, granulate it by frequent agitation, and then heat it to a dull red. Take it out of the vessel before it is quite cold, and keep it in well-stopped phials.

THERE is great confusion in the nomenclature of the alkaline carbonates. So long as taste, and the effect upon vegetable colours, were considered as tests of neutralization, potashes, salt of tartar, and barilla, were considered as having alkaline properties; and these were even obvious though a larger quantity of carbonic acid was combined; but since the atomic doctrine has become well known, the number of *primes* of alkali and acid in combination determines the nomenclature. The following table shews that the chemical nomenclature coincides with that of London and Edinburgh in regard to lime and magnesia only, and with Dublin in regard to potass, soda, and ammonia. As the term carbonate is quite ambiguous, I shall often avoid it.

Lond. and Ed.	Dub.	Chemical.
Potassa.	Kali causticum.	Potassa.
——— subcarb.	—— carb.	——— carb.
——— carb.		——— bicarb.
Sodæ subcarb.	Sodæ carb.	Sodæ carb.
——— carb.		——— bicarb.
Ammonia	Amm. caustica.	Ammonia.
——— subcarb.	—— carb.	——— carb.
Calx.	Calx.	Calx.
—— carbonas.	Creta.	—— carb.
Magnesia.	Magnesia usta.	Magnesia.
——— carbonas.	Magnesia.	——— carb.

The potass of commerce we have already shewn to contain a considerable proportion of foreign salts. By the process directed by the colleges, it is purified from those which are crystallizable; and, though it still contains muriate of potass and silica, it is sufficiently pure for the purposes of medicine. Mr Phillips says, when prepared from pearl ash it consists of about 26 carbonic acid, 71 potash and water, 2 muriate of potash, and 1 sulphate of potash, and a little silica.

The purest subcarbonate of potass, in common use, is that obtained by incinerating crude tartar, as all the substances it contains, except the potass, are decomposed by the heat. The tartaric acid and colouring matter are destroyed, and part of the carbonic acid, which is formed, unites with the potass.

The proportions of acid and alkali are variable; but by modern chemists its constitution is said to be of one proportional of carbonic acid 27, and one of potassa 45, and therefore it has been called the *Carbonate of potassa.* But this change in nomenclature must be very cautiously received, as its propriety is doubtful, and the confusion it will introduce certain.

Pharm. use.—It is used in many preparations; dissolved in the liquor potassæ subcarbonatis; decarbonated in the liquor potassæ; combined in the acetate, sulphate, tartrate, and sulphuret of potass; liquor arsenicalis et ferri alkalini; decoctum aloes comp.; mistura et pilulæ ferri comp.; to dephlegmate spirits, and to precipitate subcarbonate of magnesia, and to separate spiritus ammoniæ, et sp. amm. aromaticus.

It is incompatible also with many substances, both chemicals and galenicals. The former are well known; it neutralizes acids and acidulous salts; it decomposes salts of soda, ammonia, lime, magnesia, alumina, antimony, copper, iron, mercury, lead, silver, and zinc. It causes no precipitate in solution of tartrate of iron. Its action upon galenicals has not been so much studied, but it renders resinous and oily principles in general more soluble; it deepens the colour of all brown and red colouring matters, and it renders all the active alkaline principles, as morphia, quinia, and the astringent principle, insoluble.

Medical use.—Subcarbonate of potass is frequently employed in medicine, in conjunction with other articles, particularly for the formation of saline neutral draughts and mixtures; but it is used also by itself, in doses from three or four grains to fifteen or twenty; and it frequently operates as a powerful diuretic, particularly when aided by proper dilution.

LIQUOR POTASSÆ SUBCARBONATIS. *Lond.*
Solution of Subcarbonate of Potass.

Take of
Subcarbonate of potass, one pound;
Distilled water, twelve fluidounces.

Dissolve the subcarbonate of potass in the water, and filter through paper.

AQUA SUBCARBONATIS KALI. *Dub.*
Solution of Subcarbonate of Kali.

Take of
Subcarbonate of kali, any quantity.

Place it in a wide glass funnel, whose throat is obstructed with a rag. Set this in a cellar, that the salt may deliquesce in the moist air. Let the solution be caught in a vessel placed under it.

THE preparation of the Dublin College is the old *Oleum* *tartari per deliquium*, and is a solution of sesquicarbonate on carbonate of potass in a variable quantity of water; for, by exposure to the air, the subcarbonate attracts not only water, but carbonic acid. The name of the London College expresses the nature of its preparation, which is nearly uniform in point of strength. Dr Powell says, that the quantities ordered by the college will commonly give a solution amounting to nearly 18 ounces in bulk; and Mr Phillips says its sp. gr. is nearly 1.446.

CARBONAS POTASSÆ. *Ed.*
Carbonate of Potass.

Take of
  Pure subcarbonate of potass, two parts;
  Water, three parts.

Dissolve the subcarbonate in the water, and in a proper apparatus pass through it a stream of carbonic acid gas. Filter the solution, when it ceases to absorb acid, and afterwards evaporate with a heat not exceeding 180° Fahrenheit, so as to obtain crystals.

Carbonic acid gas is easily obtained from equal weights of carbonate of lime in powder and of sulphuric acid diluted with much water.

POTASSÆ CARBONAS. *Lond.*
Carbonate of Potass.

Take of
  Liquor of subcarbonate of potass, a gallon.

Transmit a stream of carbonic acid gas through the liquor of subcarbonate of potass, put in a proper vessel, until it be completely saturated. Filter the liquor, and evaporate with a heat which must not exceed 120° Fahren. until crystals are formed. Pour off the liquor, and dry the crystals on bibulous paper. The carbonic acid for this process is easily obtained from white marble and dilute sulphuric acid.

SUBCARBONATE of potass is easily combined with another prime of carbonic acid, in three ways; 1*st*, By exposing it, in solution, to the contact of the air for a considerable time; 2*d*, Or more quickly by making a stream of carbonic acid gas, evolved from carbonate of lime by sulphuric acid, pass through a solution of it; 3*d*, Or by heating it with carbonate of ammonia, as proposed by Berthollet.

The last process is more expensive than the second, but it does not require any particular apparatus.

The Edinburgh College, in 1817, introduced into its Pharmacopœia the second process. The London, in 1809, prescribed the last, but has in 1825 exchanged it for the second, which both Mr Phillips and Mr Brande consider as preferable. Mr Phillips, however, objects to the employment of sulphuric acid for disengaging the carbonic acid gas, from its forming an insoluble sulphate of lime on the surface of the marble, preventing its decomposition, and the difficulty of removing it after the operation, and recommends muriatic acid diluted with twice its weight of water. But there is great danger that the carbonic acid gas will in this case be contaminated with muriatic acid. The next circumstance to be considered is the strength of the alkaline solution. The object to be obtained is, that there shall be enough of water to keep the whole bicarbonate formed in a state of solution, and that there shall not be more to prolong the evaporation. The Edinburgh College used two of alkali to three of water; the London College about 57 of alkali to 54 of water. Mr Brande and Mr Phillips recommend one of alkali to five of water. If the subcarbonate were perfectly pure and entirely converted into bicarbonate, this quantity would not be too much. By calculation 11 subcarbonate should yield 12.625 bicarbonate, which require 48.5 water to dissolve them. But Mr Brande tells us that the carbonate is prepared on the great scale by dissolving 100 lbs. of purified subcarbonate in 136 pints of water, which, when saturated with carbonic acid, yields from 28 to 30 lbs. of crystallized carbonate; 50 lbs. of subcarbonate are then added to the mother liquor, with a sufficient quantity of water to make up 136 pints, and the operation repeated. This is not far from the proportion of the Edinburgh College, and shews that in making chemical calculations the quantity of the product is to be attended to as well as of the materials.

This salt is without colour or smell, and is scarcely alkaline to the taste. It is soluble in four times its weight of distilled water, at a red heat loses half its carbonic acid, and at 212° its solution loses one-fourth. When fully saturated it causes no precipitate in a solution of sulphate of magnesia.

Medical use.—The same as the subcarbonate, but it is more agreeable to the palate and stomach.

AQUA SUPERCARBONATIS POTASSÆ. *Ed.*

Solution of Supercarbonate of Potass.

Take of

Water, ten pounds;
Pure subcarbonate of potass, one ounce.

Dissolve, and expose the solution to a stream of carbonic acid, arising from

Carbonate of lime in powder,
Sulphuric acid, each three ounces;
Water, three pounds, gradually and cautiously mixed.

The chemical apparatus invented by Dr Nooth is well adapted for this preparation. But if a larger quantity of the liquor be required, an apparatus must be used capable of giving sufficient pressure.

The solution must be kept in well-corked vessels.

As soon as the preparation is finished, the liquor should be, by a peculiar contrivance, drawn off into pint bottles, which are to be well corked, wired down, and kept in a cool situation. It should be perfectly transparent, and have an acidulous, not at all alkaline, taste; and, when poured out of the bottles, it should sparkle.

Med. use.—In this solution, carbonate of potass is combined with excess of carbonic acid, by which means it is better adapted for internal use, as it is rendered not only more pleasant to the taste, but is less apt to offend the stomach. It has certainly been frequently of advantage in calculous affections, but probably only in those instances in which the stone consists of uric acid, or urate of ammonia; for, although supersaturated with carbonic acid, yet the affinity of that acid for potass is so weak, that it really operates as an alkali.

Six or eight ounces may be taken two or three times a-day. It in general proves powerfully diuretic, and sometimes produces transient inebriation. This last effect is ascribed to the carbonic acid.

ACETAS POTASSÆ. *Ed.*
Acetate of Potass.

Take of

Pure subcarbonate of potass, one pound;
Dilute acetic acid, a sufficient quantity.

Boil the subcarbonate in five pounds of acetic acid, and add more acid at different times, till on the watery part of the preceding quantity being nearly dissipated by evaporation, the new addition of acid ceases to raise any effervescence, which will happen when about twenty pounds of acid have been consumed. The mass is then to be slowly dried. The impure salt remaining is to be melted with a gentle heat, for a short time, but no longer than necessary, and afterwards dissolved in water, and filtered through paper. If the liquefaction has been properly performed, the filtered liquor will be limpid; but if otherwise, of a brown colour. Afterwards evaporate this liquor with a very gentle heat, in a very shallow glass vessel, so that on being removed from the fire it crystallizes. The acetate of potass ought to be kept in vessels very closely stopped.

POTASSÆ ACETAS. *Lond.*
Acetate of Potass.

Take of

Subcarbonate of potass, a pound and a half;
Strong acetic acid, two pints;
Distilled water, boiling, two pints.

Add the acid previously mixed with the water to the subcarbonate of potass, until it no longer cause effervescence, and filter the solution, which is to be evaporated first in a water-bath until the ebullition cease, and then exposed to a heat gradually increased until a pellicle form on the surface. Take off the pellicle and dry it on bibulous paper. Renew the evaporation several times, and remove and dry the pellicles in the same way.

ACETAS KALI. *Dub.*
Acetate of Kali.

Take of

Subcarbonate of kali, any quantity.

Add to it, at different times, about five times its weight of distilled vinegar, heated to a moderate temperature. When the effervescence shall have ceased, and the liquor is somewhat evaporated, add, at intervals, distilled vinegar, until the mixture shall entirely cease to effervesce; then evaporate to dryness; and having increased the fire a little, bring the saline mass cautiously into a state of fusion. Dissolve the salt, after it has cooled, in water: filter the solution, and evaporate until, on removing it from the fire, it shall concrete into a crystalline mass, which should be very white. Put this, as quickly as possible, into vessels accurately closed.

THIS used to be both a troublesome and expensive preparation; for, when attempted to be made with distilled vinegar, and by simply evaporating to dryness, the salt has always a dark unpleasant colour, which can neither be removed by repeated solution and crystallization, nor even by solution in alcohol. It is probable that the colour is owing to some foreign matter, which rises in distillation with the acetic acid, since, when acetic acid procured from the distillation of an acetate is employed, a colourless solution is obtained. But to whatever cause it be owing, the colour is most effectually destroyed by fusing the salt. The heat necessary to do this decomposes the colouring matter; and on dissolving the fused mass in water, and filtering the solution, we find a fine light charcoal on the filter. But this fusion is attended with considerable loss; for part of the acetic acid itself is decomposed. To ascertain the exact saturation, litmus and turmeric paper should be alternately employed. Mr Phillips says, that rather more than 21 pints of distilled vinegar, of 1.007, are required to saturate 18 ounces of subcarbonate of potass. The operator must be particularly careful, in melting it, not to use a greater heat, nor keep it longer liquefied, than what is absolutely necessary: a little should be occasionally taken out, and put into water; and, as soon as it begins to part freely with its black colour, the whole is to be removed from the fire. The exsiccation of the solution of the salt, after it has been fused, must be conducted very carefully, as it is exceedingly apt to be decomposed, which would render a new solution and exsiccation necessary.

The process of the London College is much simplified in consequence of the use of the pyrolignic acid, now officinal, which produces a white salt at once. It may be also mentioned, that this salt may be prepared by the decomposition of acetates; for example, of the acetate of lime, by tartrate of potass.

Acetate of potass has a sharp, somewhat pungent taste. It is deliquescent, and is soluble in about its own weight of water at 60°, but Mr Phillips says in half its weight at 40°. It is also, according to Dr Powell, soluble in alcohol in four times its weight. It is decomposed by the stronger acids; by a decoction of tamarinds; by the sulphates of soda and of magnesia; by muriate of ammonia; by the tartrate of soda and potass; and by some metalline salts. Its acid is destroyed by a high temperature. It consists of one proportional of acetic acid, 6.25 + one of potassa, 6, and two of water, 2.25 = 14.5 acetate of potassa.

Medical use.—Acetate of potass, however prepared, is a medicine of great efficacy, and may be so dosed and managed as to prove either mildly cathartic, or powerfully diuretic: few of the saline deobstruents equal it in virtue. The dose is from half a scruple to a drachm or two. A simple solution, however, of subcarbonate of potass in vinegar, without exsiccation, is not inferior, as a medicine, to the more expensive salt. Two drachms of the alkali, saturated with vinegar, have produced, in hydropic cases, ten or twelve stools, and a plentiful discharge of urine.

SULPHAS POTASSÆ. *Ed.*

Sulphate of Potass.

Dissolve the acidulous salt, which remains after the distillation of nitrous acid, in warm water, and having removed the superfluous acid by adding carbonate of lime in powder, set it aside until the fæces subside. Then evaporate the decanted solution, after being filtered, so that it crystallize.

POTASSÆ SULPHAS. *Lond.*

Sulphate of Potass.

Take of

The salt which remains after the distillation of nitric acid, two pounds;

Boiling water, two gallons.

Mix them so as to dissolve the salt, and then add as much subcarbonate of potass as will saturate the excessive acid. Then boil to a pellicle, and, after filtration, set it aside to crystallize. Decant off the liquor, and dry the crystals on blotting paper.

SULPHAS KALI. *Dub.*

Sulphate of Kali.

Let the salt which remains after the distillation of nitrous acid be reduced to powder, and dissolved in a sufficient quantity of boiling water. Add as much potash as will saturate the superfluous acid. Let the filtered liquor be evaporated with a very gentle heat, that it may crystallize.

THIS salt is very seldom prepared directly, as it may be obtained from the residuum of many other preparations, by simple solution and crystallization; for so strong is the affinity between sulphuric acid and potass, that they scarcely ever meet without combining to form this salt. All the sulphates, except that of baryta, are decomposed by potass and most of its combinations; and reciprocally, all the compounds of potass are decomposed by sulphuric acid and most of its combinations; and in all these decompositions, sulphate of potass is one of the products.

The greatest part of the sulphate of potass of commerce is obtained from the residuum of the distillation of sulphate of iron with nitrate of potass, by lixiviating it, supersaturating the solution with carbonate of potass, filtering it boiling hot, and allowing it to crystallize. The liquor remaining after the precipitation of magnesia is also a solution of sulphate of potass. It is likewise got in considerable quantities from the residuum remaining in the retort, after the distillation of nitrous acid, and the London and Dublin Colleges have given directions for obtaining it, in this way, by simply saturating the excess of acid with subcarbonate of potass. The Edinburgh College saturates the excess of acid by lime, and rejects the sulphate of lime formed; and Mr Phillips says it is more economical, as the sulphate of potass is not so valuable as the subcarbonate of potass used to make it.

Sulphate of potass forms small, transparent, very hard crystals of different forms, generally aggregated in crusts, and permanent in the air. It has a bitter taste, is slowly soluble in water, requiring 16 waters at 60°, and 4 at 212°. It is not soluble in alcohol. It decrepitates when thrown on live coals, and melts in a red heat.

It is an anhydrous salt, and consists of 5 dry sulphuric acid, and 6 of potassa, = 11 sulphate of potassa. It is decomposed by the barytic salts; by the nitrates and muriates of lime and of strontia; by the tartrates partially; and by the salts of mercury, silver, and lead.

Medical use.—Sulphate of potass, in small doses, as a scruple, or half a drachm, is an useful aperient; in larger ones, as four or five drachms, a mild cathartic, which does not pass off so hastily as the sulphate of soda, and seems to extend its action farther.

POTASSÆ SUPERSULPHAS. *Lond.*
Supersulphate of Potass.

Take of

The salt which remains after the distillation of nitric acid, two pounds;

Boiling water, four pints.

Mix, dissolve the salt, and filter. Then boil down the solution to one-half, and set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

THIS salt is acid to the taste, reddens vegetable blues, and effervesces with alkaline carbonates. Mr Phillips found, that 100 grains required 25 of dried subcarbonate of soda for saturation. Its preparation, however, is attended with some difficulty. When the residual salt is dissolved in only about an equal weight of water, Mr Phillips found it deposite, on cooling, supersulphate of potass, without any appearance of pellicle: but if the solution be evaporated to a pellicle, according to the former directions of the college, the whole concretes into a solid mass; and when the solution is not sufficiently concentrated, the crystals obtained are sulphate of potass. This salt was formerly called *Sal enixum* and *Tartarus vitriolatus acidus.* It is soluble in two waters at 60°, and less than one at 212°. It consists of 11 parts of sulphate of potass, and 5 sulphuric acid, 2.25 water, = 18.25.

It is used in its unrefined state by silversmiths, and is recommended by Lowitz for preparing acetic acid, by decomposing acetate of soda. It is a valuable medicine, as it enables us to give sulphuric acid in combination with an aperient salt, and is less disagreeable and more soluble than the neutral sulphate.

SULPHAS POTASSÆ CUM SULPHURE. *Ed.*
Sulphate of Potass with Sulphur.

Take of
Nitrate of potass in powder;
Sublimed sulphur, of each equal parts.

Mingle them well together, and inject the mixture, by little and little at a time, into a red hot crucible; the deflagration being over, let the salt cool, after which it is to be put into a glass vessel well corked.

THIS is a very expensive process, as the product amounts to only about four-tenths of the materials employed. At each projection the mixture melts, the sulphur floats like a brown oil on the surface of the nitre, and burns with a blue or intense white flame, giving out sulphurous acid fumes in abundance. The residuary mass consists of a white friable mass, intermixed apparently with undecomposed sulphur; and when triturated together, it forms a pale yellowish-white powder.

The constitution of this salt is not well ascertained. It has generally been considered as sulphate of potass with a little sulphur mixed with it. If it were so, the process is absurdly extravagant; but that this is not its constitution is proved by its being soluble in water, without leaving any undissolved sulphur, and forming a yellowish solution. It exhales during solution a sulphureous smell, and its taste is manifestly sulphureous. It is more soluble than sulphate of potass. The crystals are generally brilliant quadrilateral prisms with an acute rhombic base; but this is also one of the forms of sulphate of potass. It precipitates muriate of barytes; and the addition of sulphuric acid neither throws down sulphur, nor evolves a sulphureous smell. Nevertheless it does not seem to be identical with sulphate of potass, and therefore its Edinburgh name, *Sulphas potassæ cum sulphure*, and the mode of preparation proposed by some, of simply triturating these substances together, are manifestly incorrect. In its medical effects and exhibition, it agrees with sulphureous mineral waters, which contain a proportion of neutral salt.

TARTRAS POTASSÆ. *Ed.*
Tartrate of Potass.

Take of

Subcarbonate of potass, one part;
Supertartrate of potass, three parts, or as much as may be sufficient;
Boiling water, fifteen parts.

To the subcarbonate of potass, dissolved in the water, gradually add the supertartrate of potass in fine powder, as long as it raises any effervescence, which generally ceases before three times the weight of the carbonate of potass has been added; then strain the cooled liquor through paper; and, after due evaporation, set it aside to crystallize.

POTASSÆ TARTRAS. *Lond.*
Tartrate of Potass.

Take of

Subcarbonate of potass, sixteen ounces;
Supertartrate of potass, three pounds;
Boiling water, one gallon.

Dissolve the subcarbonate of potass in the water, then add the supertartrate of potass in powder, until it cease to excite effervescence. Filter the liquor through paper. Then evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

TARTRAS KALI. *Dub.*
Tartrate of Kali.

Take of

Subcarbonate of kali, one pound;

Crystals of tartar, in very fine powder, two pounds and a half, or as much as will saturate the kali;
Boiling water, a gallon.

Gradually add the tartar to the subcarbonate of kali dissolved in the water; strain the liquor through paper, evaporate it, and let it crystallize by cooling.

The tartaric acid is capable of uniting with potass in two proportions, forming in the one instance a neutral, and in the other an acidulous salt. The latter is an abundant production of nature; but it is easily converted into the former, by saturating it with potass, or by depriving it of its excess of acid. It is by the former method that the colleges direct tartrate of potass to be prepared; and the process is quite simple. The evaporation must be conducted in an earthen vessel, for iron discolours the salt. It is easily crystallized, and the crystals become moist in the air. We have here a striking example of the change produced upon the form of crystals, by saturating the excessive acid of a super-salt, the primitive form of the supertartrate being a rectangular octohedron, and of the tartrate a rectangular tetrahedral prism. It has an unpleasant bitter taste. Its constitution is acid 16.5, potass 6, water 2.25 = 16.5. It is soluble in four parts of cold water, and still more soluble in boiling water, and it is also soluble in alcohol. It is totally or partially decomposed by all acids. On this account it is improper to join it with tamarinds, or other acid fruits; which is too often done in extemporaneous practice. It is also totally decomposed by lime, baryta, strontia, and magnesia, partially by the sulphates of potass, soda, and magnesia, and by the muriate of ammonia.

Medical use.—In doses of a scruple, half a drachm, or a drachm, this salt is a mild, cooling aperient: two or three drachms commonly loosen the belly; and an ounce proves pretty strongly purgative. It has been particularly recommended as a purgative for maniacal and melancholic patients. It is an useful addition to the purgatives of the resinous kind, as it promotes their operation, and at the same time tends to correct their griping quality.

SUBCARBONAS SODÆ. *Ed.*
Subcarbonate of Soda.

Take of
Impure subcarbonate of soda, any quantity.

Bruise it; then boil in water till all the salt be dissolved. Strain the solution through paper, and evaporate it in an iron vessel, so that after it has cooled the salt may crystallize.

Dub.

Take of
Barilla, in powder, ten pounds;
Water, two gallons.

Boil the barilla in the water, in a covered vessel, for two hours, agitating it from time to time. Strain the liquor, and boil the barilla which remains, after triturating it again with an equal quantity of water. This may be repeated a third time. Evaporate the leys, filtered and mixed, in a wide iron vessel, to dryness, taking care that the saline mass remaining be not again liquefied by too great a degree of heat, and agitate it with an iron spatula, until its colour become white. Lastly, dissolve it in boiling water; and, after due evaporation, let it crystallize by slow refrigeration. The crystals will be purer, if before each boiling the barilla be exposed to the air for some time. It should be crystallized when the air is at the freezing temperature, and in a liquor whose specific gravity is 1220.

If the salt be not pure, repeat the solution and crystallization.

SODÆ SUBCARBONAS. *Lond.*
Subcarbonate of Potass.

Take of
Impure soda in powder, one pound;
Boiling distilled water, four pints.

Boil the soda in the water for half an hour, and filter. Evaporate the solution to two pints, and set it aside to crystallize. Throw away the residuary liquor.

THESE directions are principally intended for the purification of the Spanish barilla, which is a fused mass, consisting, indeed, principally of carbonate of soda, but also containing charcoal, earths, and other salts. The two first causes of impurity are easily removed by solution and filtration, and the salts may be separated by taking advantage of their different solubility in cold and in hot water. But the preparation of carbonate of soda, by the decomposition of sulphate of soda, has now become a manufacture, and is carried to such perfection, that its further purification is almost unnecessary for the purposes of the apothecary.

Its constitution is one prime acid, 2.75, one prime soda, 4, and ten primes water, 11.25=18.

SODÆ SUBCARBONAS EXSICCATA. *Lond.*
Dried Subcarbonate of Soda.

Take of

Subcarbonate of soda, one pound.

Apply a boiling heat to the subcarbonate of soda in a clean iron vessel, until it be perfectly exsiccated, stirring it continually with an iron spatula. Lastly, reduce it to powder.

CARBONAS SODÆ SICCATUM. *Dub.*
Dried Carbonate of Soda.

Liquefy over the fire, crystals of carbonate of soda, in a silver crucible, and then, increasing the heat, stir the liquefied salt, until, by the consumption of the water, it become dry.

Reduce it to fine powder, and keep it in close vessels.

SUBCARBONATE of soda, deprived of its water of crystallization, is a very excellent remedy, for which we are indebted to Dr Beddoes; he desires it to be prepared by simply exposing the pounded crystals before the fire. By simple deaquescence, crystallized carbonate of soda loses more than half its weight, and falls down into a fine permanent powder. Whenever soda is prescribed in the form of pills, the deaquesced carbonate is to be used, as, when made of the crystallized salt, they crack, and fall to pieces by the action of the air upon them.

Medical use.—Dr Beddoes first recommended the powder of effloresced soda, in calculous complaints, as a substitute for the supercarbonated alkaline waters, when these produced giddiness, or were too expensive; but its use has since been extended much farther; and it is found to be not only an excellent antacid, but seems almost to possess specific virtues in affections of the urinary organs. One or two scruples may be given, in the course of the day, in the form of powder, or in pills made up with soap and some aromatics.

CARBONÆ SODAS. *Ed.*

Take of

Subcarbonate of soda, two parts;

Water, three parts.

Dissolve the salt in the water, and pass through it a stream of carbonic acid gas, until it cease to be absorbed. Filter the liquor, and evaporate with a heat not exceeding 180, so that it form a crystalline mass.

CARBONIC acid is most easily obtained from equal weights of carbonate of lime in powder, and of sulphuric acid diluted with much water.

SODÆ CARBONAS. *Lond.*
Carbonate of Soda.

Take of
Subcarbonate of soda, one pound;
Distilled water, three pints.

Dissolve the subcarbonate of soda in the distilled water; then transmit carbonic acid gas through the liquor placed in a proper vessel, until it be fully saturated, and set it aside to crystallize. Wrap the crystals up in bibulous paper; compress and dry them. Evaporate the remaining liquor, taking care that the heat do not exceed 120, until fresh crystals are formed. Compress these in the same manner, and dry.

THIS salt, which, Dr Thomson says, is easily prepared by suspending a saturated solution of subcarbonate of soda in a distiller's fermenting tun, bears the same relation to the subcarbonate of soda that the carbonate of potass does to its subcarbonate. Its constitution is two primes of acid 5.5, one of soda 4, and one of water $1.125 = 10.625$. By heat it is readily converted into the carbonate or sesquicarbonate, which is found native in hard striated masses in the province of Sukena in Africa, and is called *Trona.*

The crystals of bicarbonate of soda are white, semi-transparent, and permanent. Their taste is still alkaline, and at 64° its solubility in water is 9.33 parts in 100.

Medical use.—The bicarbonate is used for effervescing draughts and mixtures, and the sesquicarbonate is manufactured for the use of soda-water makers.

AQUA SUPERCARBONATIS SODÆ. *Ed.*
Solution of Supercarbonate of Soda.

Take of
Water, ten pounds;
Subcarbonate of soda, two ounces.

Dissolve and pass through it a stream of carbonic acid gas, arising from
Powder of carbonate of lime;
Sulphuric acid, of each three pounds;
Water, three pounds, gradually and cautiously mixed.

Nooth's apparatus is well adapted for this process. But if a larger quantity of this solution be required, an apparatus must be used capable of furnishing sufficient pressure. The liquor should be kept in well-corked vessels.

By supersaturating soda with carbonic acid, it is rendered more agreeable to the palate, and may be taken in larger quantities, without affecting the stomach. This is now in common use as a cooling beverage, under the title of soda-water; and it may not be unnecessary to mention, that its place cannot be at all supplied by what is sold as soda powder, which is not a supercarbonate of soda, but merely a mixture of salts, which effervesces on being dissolved. Indeed, one moment's reflection must shew the impossibility of reducing to a solid form, a salt which cannot exist in solution, except under very great pressure.

PHOSPHAS SODÆ. *Ed.*
Phosphate of Soda.

Take of

Bones burnt to whiteness, and powdered, ten pounds;
Sulphuric acid, six pounds;
Subcarbonate of soda, a sufficient quantity.

Mix the powdered bones with the sulphuric acid in an earthen vessel, then add the water, and mix again; add nine pounds of water: then place the vessel in a vapour bath, and digest for three days; after which, dilute the mass with nine pounds more of boiling water, and strain the liquor through a strong linen cloth. Lastly, pour over the mass boiling water, until the whole phosphoric acid be washed out. Set by the strained liquor, that the impurities may subside; decant the clear solution, and evaporate it to nine pounds. To this liquor poured from the impurities, and heated in an earthenware vessel, add subcarbonate of soda, dissolved in warm water, until the effervescence cease. Filter, and set it aside to crystallize. To the liquor that remains after the crystals are taken out, add a little subcarbonate of soda, if necessary, so as to saturate exactly the phosphoric acid; and dispose the liquor, by evaporation, to form crystals, as long as it will furnish any. Lastly, the crystals are to be kept in a well-closed vessel.

Dub.

Take of

Burnt bones, in powder, five pounds;
Sulphuric acid, three pounds and a half, by weight.

Mix the powder, in an earthen vessel, with the sulphuric acid; gradually add five pints of water, and agitate the mixture;

digest for three days, adding, from time to time, more water, to prevent the mass from becoming dry, and continue the agitation: then add five pints of boiling water, and strain through linen, pouring on boiling water repeatedly, until all the acid be washed out. Set aside the strained liquor until the fæces subside, from which pour it off; and reduce, by evaporation, to one-half: then add, of carbonate of soda, (dissolved in a sufficient quantity of warm water,) three pounds ten ounces. Filter; and by alternate evaporation and cooling, let it form crystals, which are to be kept in a well-closed vessel.

If the salt be not sufficiently pure, dissolve and crystallize it again.

The first part of this process consists in destroying the gelatin of the bones, by the action of heat. When burnt to perfect whiteness, they retain their form, but become friable, and consist of phosphate of lime, mixed with a very little carbonate of lime and carbonate of soda. In performing this part of the process, we must take care not to heat the bones to a bright red, as by it they undergo a kind of semi-fusion, and become less soluble. The complete combustion of the charcoal is facilitated by the free contact of the air; we must therefore bring every part, in succession, to the surface, and break the larger pieces.

In the second part of the process, the phosphate of lime is decomposed by the sulphuric acid. This decomposition is, however, only partial. The sulphuric acid combines with part of the lime, and forms insoluble sulphate of lime. The phosphoric acid, separated from that portion of lime, immediately combines with the rest of the phosphate of lime, and forms biphosphate of lime, which is not further decomposable by sulphuric acid.

The biphosphate of lime, thus formed, is soluble in water; but, as the sulphate of lime, with which it is mixed, concretes into a very solid mass, it is, in some measure, defended from the action of water. On this account, the whole mass is directed to be digested, for three days, in vapour, by which means it is thoroughly penetrated, and prepared for solution in the boiling water, which is afterwards poured on it. It is probably to render the subsequent solution easier, that Thenard directs the bone-ashes to be made with water into a thin paste *(bouillé)* before the sulphuric acid is added to them.

Having thus got a solution of biphosphate of lime, it is next decomposed by subcarbonate of soda, dissolved in water.

This decomposition, likewise, is only partial, as it depriv the biphosphate of lime of its excess of acid only, and r duces it to the state of phosphate. The phosphate of lim being insoluble, is easily separated by filtration, and the pho phate of soda remains in solution. According to Thenar the nicest point in the whole process is the determination the proper quantity of carbonate of soda to be added. A the phosphate of soda does not crystallize freely, unless the be a slight excess of base, he directs that a little more ca bonate of soda be added than what is merely sufficient t saturate the excess of acid in the biphosphate of lime, bu not to continue the addition until it cease to produce an precipitate. We must also take care not to carry the ev poration of the solution of phosphate of soda so far as to for a pellicle; for it then concretes into an irregular mass, an does not form beautiful crystals. After each crystallizatio we must examine the liquor which remains, and, if it be aci or merely neutral, add to it a little of the solution of carb nate of soda. In this way, Thenard got from 2100 par of bone-ashes, 700 of sulphuric acid, 667 of carbonate soda, and 885 of phosphate of soda.

Mr Funcke, of Linz, has discovered a still more econom cal and expeditious method. It consists in saturating th excess of lime in calcined bones with diluted sulphuric aci and then dissolving the remaining phosphate of lime in nitri acid. To this solution he adds an equal quantity of sulpha of soda, and then recovers the nitric acid by distillatio The phosphate of soda is then separated from the sulpha of lime, by the affusion of water and crystallization.

Phosphate of soda crystallizes in rhomboidal prisms, term nated by three-sided pyramids. Its taste resembles that common salt. At 60° it is soluble in four parts of water, an at 212° in two. It effloresces in the air. By heat, it unde goes the watery fusion, and at last melts into a white mas It consists of 3.5 phosphoric acid, 4 soda, and 13.5 wat of crystallization = 21. It is decomposed by most of the sal having an earthy base.

Medical use.—Phosphate of soda was introduced into th practice of physic by Dr George Pearson of London. possesses the same medical qualities as sulphate of sod and the tartrate of potass and soda, being an excelle purgative, in the quantity of an ounce or ten drachms and it has the peculiar advantage over these two salts, being much less nauseous than they are. Its taste is extrem ly similar to that of common salt; and, when given in a ba on of gruel, or veal broth, made without salt, it is scarcely erceptible by the palate; and consequently it is well adapt-d for patients whose stomachs are delicate, and who have n antipathy against the other saline purges. The only ob-ection to its general use is the very great difference between s price and that of the sulphate of soda and sulphate of agnesia.

MURIAS SODÆ SICCATUM. *Dub.*
Dried Muriate of Soda.

ake of
Muriate of soda, any quantity.
oast it over the fire in an iron vessel, loosely covered, until it cease to decrepitate, agitating it from time to time.

BY this process, the sea salt is reduced into the state in hich it is employed for the distillation of muriatic acid. t not only deprives it entirely of any adhering and interpo-ed water, but also destroys some colouring matter which contains; for if we prepare muriatic acid from crystallized uriate of soda, we obtain a coloured muriatic acid, while e decrepitated muriate furnishes a colourless one.

SULPHAS SODÆ. *Ed.*
Sulphate of Soda.

issolve the acidulous salt, which remains after the distillation of muriatic acid, in water; and having mixed powdered chalk with it, to remove the superfluous acid, set it aside until the sediment subsides; then strain through paper the liquor decanted from them, and evaporate so that it may crystallize.

SODÆ SULPHAS. *Lond.*

ake of
The salt which remains after the distillation of muriatic acid, two pounds;
Boiling water, two pints and a half.
issolve the salt in the water, and gradually add as much subcarbonate of soda as will saturate the excessive acid. Evaporate until a pellicle appear, and, after filtering the liquor, set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

Dub.

issolve the salt, which remains after the distillation of muriatic acid, in a sufficient quantity of boiling water. Filter the solution, and after due evaporation crystallize the sal by slow refrigeration.

The residuum of the process for preparing muriatic acic is an acidulous sulphate of soda, which is easily converte into a neutral sulphate by neutralizing or removing the acic in excess. The London College preserve the superabundan acid, by saturating it with carbonate of soda; the Edinburgl College get rid of it by saturating it with carbonate of lime with which it forms an insoluble sulphate of lime. In fact the price of sulphate of soda is so very small, that it is n economy to use carbonate of soda to saturate the superabundant acid.

By far the greatest part of the sulphate of soda is obtaine from manufacturers, as a result of processes performed fo the sake of other substances, as in the preparation of muriat of ammonia, oxymuriatic acid, &c. It may be economically obtained by making into a paste, with a sufficient quantity of water, eight parts of burnt gypsum, five of clay, an five of sea-salt. This mixture is burnt in a kiln or oven then ground to powder, diffused in a sufficient quantity c water, and, after being strained, is evaporated until it wil form crystals of sulphate of soda. The mother water contains muriate of lime and alumine.

Sulphate of soda crystallizes in six-sided prisms, terminated by dihedral summits. The crystals are often irregula and their sides are usually channelled. Their taste is at firs salt, and afterwards disagreeably bitter. They are solubl in 2.67 parts of water at 60°, and in 0.8 at 212°. In the ai they deaquesce and fall to powder. They undergo the watery fusion, and, in a red heat, melt. They consist of 5 sulphuric acid, 4 soda, and 11.25 water = 20.25; and whe dried at 700°, of 5 acid, and 4 soda. It is decomposed b baryta and potass, and salts containing these bases, and b the salts of silver, mercury and lead.

Medical use.—Formerly this was the most common of th saline purgatives, but it has been in a great degree superseded by the sulphate of magnesia. Taken in doses of fror half an ounce, to an ounce or more, it proves a mild an useful purgative; and in smaller doses largely diluted, a serviceable aperient and diuretic. It is commonly given in solution, but it may also be given in powder, after it has deaquesced. In this form the dose must be reduced to one hal

TARTRAS POTASSÆ ET SODÆ. *Ed.*
Tartrate of Potass and Soda.

Take of
Subcarbonate of soda, one part;
Supertartrate of potass, three parts, or a sufficient quantity;
Boiling water, fifteen parts.

To the subcarbonate dissolved in the water, add the supertartrate in fine powder as long as it produces any effervescence, which commonly ceases before three times the weight of the subcarbonate be added. Then filter the liquor, after it is cold, through paper, and after due evaporation set it aside to crystallize.

TARTARAS SODÆ ET KALI. *Dub.*
Tartrate of Soda and Kali.

Take of
Carbonate of soda, twenty ounces;
Crystals of tartar in very fine powder, two pounds;
Distilled water, boiling, ten pints.

Dissolve the subcarbonate of soda in the water, and gradually add the crystals of tartar; filter the liquor through paper; evaporate, and set it aside to crystallize by slow cooling.

SODA TARTARIZATA. *Lond.*
Tartarized Soda.

Take of
Subcarbonate of soda, twenty ounces;
Supertartrate of potass, in powder, two pounds;
Boiling water, ten pints.

Dissolve the subcarbonate of soda in the water, and gradually add the supertartrate of potass. Filter the solution through paper; evaporate until a pellicle be formed, and set it aside to crystallize. Pour off the liquor, and dry the crystals on blotting paper.

THE tartaric acid, in several instances, is capable of entering into combination, at the same time, with two bases. In the present example, the second prime of acid of the supertartrate of potass is neutralized with soda, and, in place of a mixture of tartrate of potass and tartrate of soda, each possessing their own properties, there results a triple salt, having peculiar properties.

Mr Phillips found that 18 parts of subcarbonate of soda were sufficient to neutralize 24 of supertartrate of potass, which is conformable with the analysis of these salts. It would therefore appear, that the Edinburgh College orders a great excess of crystals of tartar. The tartrate of potass and soda forms large and very regular crystals, in the form of prisms with eight sides, nearly equal, which are often divided longitudinally, almost through their axis. It has a bitter taste. It is soluble in about five parts of water, and deaquesces in the air. It is decomposed by the strong acids, which combine with the soda, and separate supertartrate of potass, and by baryta and lime, which form insoluble tartrates. By heat its acid is destroyed. It consists of 14.25 tartrate of potass, and 12.25 tartrate of soda, with 9 water.

Medical use.—It was introduced into medical practice by M. Seignette, an apothecary at Rochelle, whose name it long bore, and it is still very much employed as an excellent purgative salt. The dose is from six to ten drachms.

AQUA AMMONIÆ. *Ed.*
Water of Ammonia.

Take of
  Muriate of ammonia, one pound;
  Quicklime, fresh burnt, one pound and a half;
  Distilled water, one pound;
  Water, nine ounces.

Pour the water on the lime broken into bits, contained in an iron or earthen vessel, which is then to be covered up until the slaked lime cool. Then having previously ground the muriate into a very fine powder, mix it thoroughly with the lime, by triturating them together in a mortar, and immediately put the mixture into a glass retort. Place the retort in a sand-bath, and connect with it a receiver furnished with a tube which is to be inserted almost to the bottom of a phial, containing the distilled water. But the phial should be only half filled.

The fire is now to be kindled, and gradually increased, until the bottom of the sand pot begin to get red, and no more gas and liquor come over.

AQUA AMMONIÆ CAUSTICÆ. *Dub.*
Water of Caustic Ammonia.

Take of
  Muriate of ammonia, sixteen ounces;
  Lime, fresh burnt, two pounds;
  Water, six pints.

Sprinkle one pint of the water upon the lime, placed in a stoneware vessel, and cover it up. Twenty-four hours afterwards, mix the salt with the lime, which will have crumbled to powder, taking care to avoid the vapours. Then put the mixture into a retort, and pour upon it the rest of the water. Having previously agitated them, draw off, with a moderate heat, twenty ounces, by measure, of liquor, into a refrigerated receiver, having luted carefully the joining of the vessels.

The specific gravity of this liquor is to that of distilled water as 936 to 1000.

LIQUOR AMMONIÆ. *Lond.*

Take of

Muriate of ammonia, eight ounces;
Fresh lime, six ounces;
Water, four pints.

Pour a pint of the water upon the lime: then cover the vessel and set it aside for an hour; afterwards add the muriate of ammonia and the rest of the water previously heated to ebullition, and cover up the vessel again. Filter the liquor after it has cooled, and draw off by distillation twelve fluidounces of liquor of ammonia, into a receiver, whose temperature does not exceed 50°.

The specific gravity of liquor of ammonia is to that of water as 0.960 to 1000.

In this process, the muriate of ammonia is decomposed by the lime, in consequence of its having a stronger affinity for muriatic acid than ammonia has, and the ammonia is either distilled off along with water, or escapes in the form of gas. to be absorbed by water placed in the receiver.

It is absolutely necessary that the lime employed be very recently burnt, as the presence of carbonic acid would render the ammonia partially carbonated. The lime is slaked before it is mixed with the muriate of ammonia, in order that the heat generated during the slaking may not decompose the muriate, which is the case when they are mixed before adding the water. The proportion of lime to the sal ammoniac used by the colleges is very different, being as 3 to 2 by Edinburgh and Dublin, and as 3 to 4 by London.

The addition of more water than exists in the slaked lime is essential to the existence of the ammonia in a liquid form under the pressure of the atmosphere; for in itself it is a permanently elastic fluid *; but the colleges differ both in the quantity added and the mode of conducting the process.

In the process directed in the Edinburgh Pharmacopœia, the ammonia is disengaged in the form of gas, and it is combined with a quantity of water equal only to the weight of the muriate of ammonia, by means of slight pressure in a pneumatic apparatus. By this process the whole ammonia is condensed and obtained, and the water should be saturated with it; but of this strength it is never sold in the shops, unless particularly desired, and, for common sale, it is always diluted with a certain proportion of water.

In the process adopted by the Dublin College, six times as much water is used as is sufficient to absorb all the ammonia; the excess is intended to render the decomposition slower and more manageable, and to keep the muriate of lime, which remains in the retort, in solution; for otherwise it concretes into a solid mass, adhering strongly to the bottom of the retort, very difficult to be washed out, and often endangering its breaking.

The London process differs from that of Dublin, in employing still more water, eight times as much as Edinburgh, and in filtering the materials after they have been mixed. By this means we keep out of the retort any undissolved lime, and the success of the process shews that the decomposition takes place before the heat is applied, and that the filtered solution must contain muriate of lime and ammonia.

A very small degree of heat is sufficient for the distillation in either case, and the whole ammonia arises with the first portion of water, and even partly before it. It is therefore necessary that the vessels be very closely luted to each

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* Ammonia consists of 1 volume of nitrogen and 3 of hydrogen, or 3 of hydrogen and 14 of nitrogen by weight. As a gas, it is perfectly transparent and colourless; elastic; specific gravity 0.53125, air = 1; or 100 inches weigh 18.0035 grains; has a urinous and acrid odour, irritating the nostrils and eyes, and an acrid and caustic taste; is irrespirable; extinguishes flame; colours vegetable blues green; and is decomposed by being transmitted through a red-hot tube, and by the electric spark, into its constituent gases; and by oxygen and atmospheric air at a red heat; and by oxymuriatic acid (chlorine,) it is converted into water and nitrogen gas. It is absorbed without change by porous bodies; it dissolves sulphur and phosphorus, and combines readily with water in all its states. Water, at a mean temperature and pressure, is saturated by 670 times its volume of gaseous ammonia, is thereby increased in bulk, and acquires the specific gravity of 0.875. Mr Faraday, by subjecting ammoniacal gas to a pressure of about 6.5 atmospheres at 50° compressed it into a colourless limpid liquid of 0.760. Ammonia combines with all the acids, forming neutral salts, and with some of the oxides. It is formed during the putrefactive fermentation.

other, to prevent it from escaping until water rise to condense it. But this renders the utmost care necessary in the distillation; for too sudden, or too great a heat, from the rapid disengagement of gas, or even the expansion of the air contained in the vessels, would endanger their bursting.

The different colleges have different methods of ascertaining that the process is complete. The Edinburgh, using no more water than is necessary to condense the gas, distil to dryness. The London draw off 12 floz. from 8 ounces of sal ammonia, and the Dublin 20 floz. from 16. The strength is therefore very different; the Edinburgh and Dublin having a sp. gr. of 0.936, and the London 0.960.

Mr Phillips, although he allows the process of the Edinburgh College to be more economical than that of the London, as 16 to 10, yet objects to it, that the quantity of lime is much too large, requiring large vessels; and that the mixture of the ingredients is a most pungent operation. Dr Hope admits the odour is unquestionably pungent, but that it may be, in a great measure, avoided by adroitness; and contends that the excess of lime is in this instance particularly useful in accelerating the disengagement of the ammonia, and rendering a less elevation of temperature necessary. Mr Phillips, on repeating the process of the Edinburgh College, obtained an *aqua ammoniæ* of sp. gr. 0.936, and equivalent to 40.5 of strength; by the same process, with the lime reduced to two-thirds of the quantity ordered, the mean strength was 40, which he therefore considered a great improvement.

Dörfurt, Bucholz, and Van Mons, agree in recommending nearly the following process, which differs a little from that of the Edinburgh College. Slake 16 oz. of lime with a sufficient quantity of water to form a thick paste; put it into a cucurbit, and add 16 oz. of sal ammoniac; lute on the capital, furnished with a bent tube, reaching to the bottom of a receiver containing 24 oz. of water, and draw off 24 oz., which is known by the solution filling the space of 48 oz. previously marked on the receiver, and keep it in phials perfectly closed, by dipping their necks when corked in melted wax.

Table of the Quantities of Real or Gaseous Ammonia in solutions of different Specific Gravities. (Dalton.)

Specific Gravity.	Grains of ammonia in 100 water grain measures of liquid.	Grains of ammonia in 100 grains of liquid.	Boiling point of the liquid. Fahr. scale.	Volumes of gas condensed in a given vol. of liquid.
.85	30	35.3	26°	494
.86	28	32.6	38	456
.87	26	29.9	50	419
.88	24	27.3	62	382
.89	22	24.7	74	346
.90	20	22.2	86	311
.91	18	19.8	98	277
.92	16	17.4	100	244
.93	14	15.1	122	211
.94	12	12.8	134	180
.95	10	10.5	146	147
.96	8	8.3	158	116
.97	6	6.2	173	87
.98	4	4.1	187	57
.99	2	2.	196	28

Sir Humphry Davy's results were somewhat different. He found 100 parts of sp. gr. 0.875, to contain 32.5 of ammonia; of sp. gr. 0.9054, 25.37; and of sp. gr. 0.9692, 9.5 of ammonia.

Liquid ammonia is perfectly limpid and colourless, very volatile; has a pungent urinous smell, and a caustic urinous taste. It forms a white soapy liniment when mixed with fixed oil.

Water of ammonia decomposes many of the earthy, and all the metalline salts, and is capable of dissolving, or combining with, many of the metalline oxides, and even of oxidizing some of the metals. When pure, water of ammonia does not effervesce with any of the acids, or form a precipitate with lime water or alcohol. As it readily absorbs carbonic acid from the atmosphere, the Edinburgh College, very properly, order it to be kept in small phials. By neglecting this precaution in the shops, it often becomes carbonated before the large bottles, in which it is commonly kept, be half expended.

Pharm. use.—It is combined with alcohol in the spirit of ammonia; with hydrothionic acid in the hydro-sulphuret of ammonia, and with unctuous substances in the volatile and mercurial liniments, and it is used as a solvent in the compound camphor liniment, and the volatile tinctures in general.

Medical use.—Water of caustic ammonia is very rarely given internally, although it may be used in doses of ten to twenty drops largely diluted, as a powerful stimulant in asphyxia, and similar diseases. Externally, it is applied to the skin as a rubefacient, and, in the form of gas, to the nostrils, and to the eyes, as a stimulant in cases of torpor, paralysis, rheumatism, syncope, hysteria, and chronic ophthalmia.

AQUA AMMONIÆ DILUTA. *Ed.*
Diluted Water of Ammonia.

Take of
  Water of ammonia, one part;
  Distilled water, two parts.
Mix them.

THIS formula for preparing a diluted solution of ammonia is absolutely necessary; for water of ammonia, of the strength obtained by following the direction of the Edinburgh College, is perfectly unmanageable, and in fact is never dispensed by the apothecaries, who have always been in the practice of substituting, (and it is well they did so,) for water of ammonia, when prescribed, a form of it diluted according to their own judgment.

ALCOHOL AMMONIATUM. *Ed.*
Ammoniated Alcohol.

Take of
  Stronger alcohol, thirty-two ounces;
  Fresh lime, twelve ounces;
  Muriate of ammonia, eight ounces;
  Water, six ounces.

Pour the water on the pounded lime in an iron or earthenware vessel, cover the vessel until the lime fall to powder; then mix the muriate in very fine powder with the lime, by rubbing them together in a mortar, and immediately introduce them into a glass retort. Place the retort in a sand bath, and fit on closely a receiver, furnished with a tube which passes to the bottom of a bottle containing the alcohol, but large enough to hold forty-eight ounces.

Lastly, apply heat, to be gradually increased, until the bottom of the iron pot become red, and continue it as long as gas and fluid come over.

Spiritus ammoniæ. *Dub.*
Spirit of Ammonia.

Take of
  Proof-spirit, three pints;
  Muriate of ammonia, four ounces;
  Potashes, six ounces.
Mix, and distil, with a slow fire, two pints.

Lond.

Take of
  Proof-spirit, three pints;
  Muriate of ammonia, four ounces;
  Subcarbonate of potass, six ounces.
Mix and draw off with a gentle heat, a pint and a half into a cooled receiver.

The two processes here described yield products considerably different. In that of the Edinburgh College, ammoniacal gas is disengaged by the decomposition of muriate of ammonia, and absorbed to saturation by rectified spirit. In short it is a perfect solution of ammonia in alcohol, and a most powerful agent both on the animal economy and as a chemical solvent.

The process of the London and Dublin Colleges are far from being so perfect.

When muriate of ammonia is decomposed by potashes, the product is chiefly carbonate of ammonia; and as diluted alcohol is employed by the colleges, and one half only is drawn off, it is evident that there is either a want of economy, or the whole alcohol comes over before any of the water. But if the latter supposition be true, there is also a want of economy; for the alcohol will dissolve, besides the ammonia, very little of the carbonate. I have found by trial, that when we perform this process exactly, a very large proportion of carbonate of ammonia sublimes, which remains undissolved in the distilled liquor; but as this liquor (after the particles of carbonate of ammonia which were diffused through it have separated in the form of very regular crystals, adhering to the sides of the vessel) effervesces with acids, the distilled liquor cannot be pure alcohol, but must contain a proportion of water capable of dissolving some carbonate of ammonia, and the product is in fact unfit for the preparation of the aromatic ammoniated alcohol, as it will not dissolve the volatile oils.

The Berlin College direct this preparation to be made by simply mixing two parts of alcohol with one of water of ammonia; and the London College adopted this process in 1809, but in 1825 have reverted to the old unchemical process. The objection urged against the new processes by Mr Phillips, that they yield a stronger product, I consider as the great argument in their favour. Mr Phillips found, that when the spirit of ammonia was prepared by the process 1809, with liq. am. of 0.914, the saturating power of a fluidounce as an alkali was equal to 95 grains of marble; whereas, by the potash process, its saturating power = 32 grains of marble; the former being three times as great as the latter, besides being caustic instead of subcarbonated.

Pharm. use.—It is used directly, or indirectly to dissolve camphor, and volatile oils. When prepared of the strength directed by the Edinburgh College, and saturated with camphor, it forms the most stimulating liniment we possess.

Med. use.—It is a most powerful diffusible stimulant, and must be exhibited internally, with great caution, and much diluted. Externally it is a powerful rubefacient.

SUBCARBONAS AMMONIÆ. *Ed.*
Carbonate of Ammonia.

Take of
Muriate of ammonia, one part;
Soft carbonate of lime, dried, two parts.
Having triturated them separately, mix them thoroughly, and sublime from a retort into a refrigerated receiver.

Dub.

Take of
Muriate of ammonia, in powder, and well dried,
Dried carbonate of soda, of each half a pound.
Mix them, put them into an earthen retort, and sublime, with a heat gradually raised, into a cooled receiver.

AMMONIÆ SUBCARBONAS. *Lond.*
Subcarbonate of Ammonia.

Take of
Muriate of ammonia, one pound;
Prepared chalk, dried, one pound and a half.
Triturate them separately, then mix and sublime them with a gradually increased heat, until the retort become red.

In this process the two substances employed undergo a mutual decomposition, the muriatic acid combining with the lime or the soda, and the carbonic acid with the ammonia. The proportion of carbonate of lime directed by the Edinburgh College is more than sufficient to decompose the muriate of ammonia; but it is the safe side to err on; for it is only inconvenient, from obliging us to make use of larger vessels, and perhaps uneconomical, from requiring more fuel; whereas, if any portion of the muriate of ammonia were to remain undecomposed, it would sublime along with the carbonate, and render the product impure. By calculation, 6.25 of carbonate of lime are sufficient to decompose 6.75 muriate of ammonia, and Mr Phillips thinks that one proportion and a half of chalk would be amply sufficient. Göttling uses three parts of dried chalk to two of muriate of ammonia. The ingredients are to be thoroughly mixed by trituration, before they are introduced into the retort, that no part of the muriate of ammonia may escape decomposition. Carbonate of lime does not act on muriate of ammonia till a considerable heat be applied. Göttling says, that the sublimation must be conducted in the open fire, and therefore he uses an earthenware cucurbit, with a tubulated capital. When a glass retort is employed, it should have a very wide neck; and the best form for the receiver is cylindrical, as it enables us to get out the carbonate of ammonia condensed in it without breaking it. The residuum which remains in the retort is chloride of calcium: the oxygen of the lime having formed water with the hydrogen of the muriatic acid, furnishes muriate of lime by lixiviation and evaporation.

By the Dublin College, carbonate of soda is employed for the preparation of carbonate of ammonia. The theory of the process is the same, and the decomposition is effected at a lower temperature. But the presence of so large a proportion of water as exists in the carbonate of soda is an objection to its use. It is also said that part of the ammonia is evolved in the form of gas, which, if not permitted to escape, will burst the vessels. To prevent this loss, therefore, Mr Göttling uses a cucurbit and capital, furnished with a bent tube, which is to be immersed in a phial of water; by which contrivance, while the carbonate of ammonia is condensed in the capital, the gaseous ammonia is absorbed by the water. When soda is used, the residuum is chloride of sodium, or contains muriate of soda.

Carbonate of ammonia is obtained in the form of a white crystallized mass, of a fibrous texture, having the smell and taste of ammonia, but weaker. It is soluble in twice its weight of cold water; Mr Phillips says four times; its solubility is increased by increase of temperature; but when dissolved in boiling water, it loses a portion of its ammonia (?) with effervescence. It is insoluble in alcohol. It is said to vary very much in its composition, and to contain more ammonia, and less acid and water, in proportion to the high temperature employed in preparing it; the quantity of alkali varying from 50 to 20 *per cent.* Dr Thomson says that he has never met in commerce with a fully saturated carbonate of ammonia, and that even the freshest was in a state of sesquicarbonate, or 1 prime of ammonia with 1½ carbonic acid. Even this by keeping soon loses ammonia, and becomes a bicarbonate, which is characterized by having no pungent odour. It is decomposed by most of the acids, and all the alkaline, and some of the earthy bases; by the earthy sulphates, except those of baryta and strontia; by the earthy muriates and fluates; by the nitrates of baryta, and superphosphate of lime.

Pharm. use.—It is dissolved in the Solution of subcarbonate of ammonia; and decomposed in the solution of acetate of ammonia and in ammoniuret of copper.

Medical use.—Carbonate of ammonia exactly resembles ammonia in its action on the living body; but is weaker, and is principally used as smelling salts in syncope and hysteria.

SOLUTIO SUBCARBONATIS AMMONIÆ. *Ed.*
Solution of Subcarbonate of Ammonia.

Take of
 Subcarbonate of ammonia, one part;
 Distilled water, four parts.

Dissolve the subcarbonate in the water, and filter through paper.

LIQUOR AMMONIÆ SUBCARBONATIS. *Lond.*
Liquor of Subcarbonate of Ammonia.

Take of
 Subcarbonate of ammonia, four ounces;
 Distilled water, a pint.

Dissolve the subcarbonate of ammonia in the water, and filter through paper.

AQUA CARBONATIS AMMONIÆ. *Dub.*
Water of Carbonate of Ammonia.

Take of
 Muriate of ammonia, one pound;

Carbonate of soda, twenty-eight ounces;
Water, three pints.
Distil off, by a heat gradually raised, two pints.
The specific gravity of this liquor is 1095.

THE nature of the two first of these preparations is evident; and from the method being more simple and uniform, and even economical, it is preferable to the last, for which it is a substitute, as the product in that case is also a solution of carbonate of ammonia, while the residuum in the retort is an alkaline muriate. In this instance, the decomposition of the muriate of ammonia cannot be effected by carbonate of lime, because the addition of the water prevents the application of the necessary heat, whereas alkaline carbonates act at a moderate temperature.

LIQUOR VOLATILIS CORNU CERVINI. *Dub.*
Volatile Liquor of Hartshorn.

Take of
Hartshorn, any quantity.
Put it into a retort, and distil, with a gradually increased heat, the volatile liquor, salt, and oil. Then repeat the distillation of the volatile liquor until it becomes as limpid as water, separating by filtration the oil and salt after each distillation. The liquor will be more easily purified, if, after each distillation, except the first, there be added about a sixth part of its weight of charcoal of wood previously heated to redness, then extinguished, by covering it with sand, and powdered while it is hot.
If hartshorn cannot be had, the bones of any other land animal may be substituted for them.

THE wholesale dealers have very large pots for this distillation, with earthen heads, almost like those of the common still; for receivers they use a couple of oil jars, the mouths of which are luted together; the pipe that comes from the head is connected by means of an adopter with the lower jar, which is also furnished with a cock for drawing off the fluids condensed in it. The upper jar is entire, and in it is condensed the solid carbonate of ammonia. When a large quantity of the subject is to be distilled, it is customary to continue the operation for several days successively; only unluting the head occasionally, to put in fresh materials. When the upper jar becomes entirely filled with carbonate of ammonia, it cracks. It is then to be removed, the salt to be taken out of it, and a fresh one substituted in its place.

When only a small quantity is wanted, a common iron pot, uch as is usually fixed in sand furnaces, may be employed, an iron head being fitted to it. The receiver ought to be arge, and a glass, or rather tin adopter inserted between it and the head of the pot.

The distilling vessel being charged with pieces of horn, a moderate fire is applied, which is slowly increased, and raied at length to a very high degree. At first water arises, which gradually acquires colour and smell, from the admixure of empyreumatic oil and ammoniacal salts; carbonate of ammonia next arises, which at first dissolves, as it comes over, in the water, and thus forms what is called the *spirit*. When the water is saturated, the remainder of the salt concretes in a solid form on the sides of the recipient. If it be required to have the whole of the salt solid, and undissolved, the water should be removed as soon as the salt begins to arise, which may be known by the appearance of white fumes; and that this may be done the more commodiously, the receiver should be left unluted, till this first part of the process be finished. The white vapours, which now arise, sometimes come over with such vehemence as to throw off or burst the receiver: to prevent this accident, it is convenient to have a small hole in the luting, which may be occasionally stopt with a wooden peg, or opened, as the operator shall find proper. Lastly, the oil arises, which acquires more colour and consistency as the operation advances. Carbonate of ammonia still comes over, but it is partly dissolved in the hot oily vapour. At the same time, there is a considerable disengagement of gas, consisting of a mixture of carburetted hydrogen, often containing sulphur and phosphorus, and of carbonic acid.

All the liquid matters being poured out of the receiver, the salt, which remains adhering to its sides, is to be washed out with a little water, and added to the rest. It is convenient to let the whole stand for a few hours, that the oil may the better disengage itself from the liquor, so as to be separated first by a funnel, and afterwards more perfectly by filtration through wet paper.

None of these products, except perhaps a small quantity of the carbonic acid, exist ready formed in the matter subjected to the distillation, but they are produced by a new arrangement of its constituents. For the production of ammonia, it is absolutely necessary that it contain nitrogen, or be what we have called a quaternary oxide. Although some vegetable, and most animal, substances are of this kind, yet only the most solid parts of animals, such as bone or horn are employed for the production of ammonia ; because the furnish it less mixed with other substances, are easily obtained and at little expense, and are very manageable in th distillation. On the application of heat, as soon as all th water which they contained is expelled, their elements begin to act on each other, and to form binary, or at most ternary compounds. Water is formed of part of the oxyge and hydrogen ; ammonia of nitrogen and hydrogen ; carbonic acid of carbon and oxygen ; then oil of hydrogen, oxygen and carbon ; while the superfluous carbon remains i the retort in the state of animal charcoal, commonly calle Ivory black. As the formation of these substances is simultaneous, or in immediate succession, they are not obtaine separately, but are mixed with each other. The water is saturated with carbonate of ammonia, and impregnated wit empyreumatic oil, while the carbonate of ammonia is discoloured with oil ; and the oil contains carbonate of ammoni dissolved in it. They may, however, be separated from eac other, in a great measure, in the manner already described But a small portion of oil obstinately adheres both to the sal and its solution, which constitutes the only difference betwee salt and spirit of hartshorn, as they are called, and the pure carbonate of ammonia, as obtained by the decomposition o muriate of ammonia.

Pharm. and Med. use.—The solution of subcarbonate o ammonia is used by the Dublin College to precipitate the pulvis hydrargyri cinereus, and in general agrees in its chemical and medical relations with the other preparations o ammonia.

AQUA ACETATIS AMMONIÆ. *Ed.*

Water of Acetate of Ammonia.

Take of

Subcarbonate of ammonia in powder, any quantity ;
Dilute acetic acid, a sufficient quantity.

Add the acid gradually, until the subcarbonate is accurately saturated.

Dub.

Take of

Carbonate of ammonia, two ounces.

Add gradually, with frequent agitation, three pounds and a half of distilled vinegar, or as much as will saturate the ammonia, as proved by the test of litmus.

LIQUOR AMMONIÆ ACETATIS. *Lond.*
Solution of Acetate of Ammonia.

Take of
Carbonate of ammonia, two ounces;
Acetic acid, four pints, or what may be required.

Add the acid to the carbonate of ammonia until the effervescence cease, and mix.

In this process the acetic acid combines with the ammonia, and the carbonic acid is expelled with effervescence.

The exact point of saturation should be ascertained by the alternate use of litmus and turmeric papers.

The acetate of ammonia is dissolved in the water of the acetic acid; but as this is apt to vary in quantity, the solution also varies in strength, and the crystallization of the salt is attended with too much difficulty to be practised for pharmaceutical purposes.

Different proposals have been made to get a solution of greater strength and uniformity than that still retained by the British colleges. M. Löwe saturates four ounces of carbonate of potass with distilled vinegar, and evaporates the solution to 36 ounces. He then mixes it with two ounces of muriate of ammonia, and distils the mixture in a glass retort. Acetate of ammonia comes over. The last edition of the Prussian Pharmacopœia prepares it by saturating three ounces of carbonate of ammonia with a strong acetic acid (obtained by distillation from acetate of soda, dissolved in two parts of water, and decomposed by sulphuric acid,) and diluting the solution with water, so that it shall weigh twenty-four ounces. One ounce, therefore, contains the alkali of a drachm of carbonate of ammonia.

The crystals of acetate of ammonia are long, slender and flatted, of a pearly white colour, and of a cool sweetish taste, are very deliquescent, melt at 170°, and sublime at 250°. It is decomposed by the acids, alkalies, and several of the earths, and metalline salts; and when in solution, its acid is decomposed spontaneously, and by heat. It is also decomposed by a solution of snperacetate of lead. This was suspected to be owing to the vinegar employed being contaminated with sulphuric acid; but Mr Phillips has proved, that it arises from some of the carbonic acid remaining diffused through the solution.

Medical use.—Acetate of ammonia in solution, when assisted by a warm regimen, has a determination to the surface, and proves an excellent and powerful sudorific; and from its mode of operation, it is admissible in febrile and inflammatory diseases, in which the use of more stimulating sudorifics are attended with danger. Its action may likewise be determined to the kidneys, by walking about in a cool air. The common dose is half an ounce, either by itself or in combination with other substances.

CHAP. IV.—EARTHS AND EARTHY SALTS.

MURIAS BARYTÆ. *Ed.*
Muriate of Baryta.

1st Process.

Take of
Carbonate of baryta,
Muriatic acid, of each one part;
Water, three parts.

Add the carbonate, broken into little bits, to the water and acid, previously mixed. After the effervescence has ceased, digest for an hour, strain the liquor, and, after due evaporation, set it aside to crystallize. Repeat the evaporation as long as any crystals are formed.

2d Process.

If the carbonate of baryta cannot be procured, the muriate may be prepared in the following manner from the sulphate

Take of
Sulphate of baryta, two pounds;
Charcoal of wood, in powder, four ounces;
Muriatic acid, a sufficient quantity.

Roast the sulphate, that it may be more easily reduced to a very fine powder, with which the powdered charcoal is to be intimately mixed. Put the mixture into a crucible, and having fitted it with a cover, heat it with a strong fire for six hours. Then triturate the matter well, and throw it into six pounds of water in an earthen or glass vessel, and mix them by agitation, preventing as much as possible the action of the air.

Let the vessel stand in a vapour bath until the part not dissolved shall subside, then pour off the liquor. On the undissolved part pour four pounds more of boiling water, which, after agitation and deposition, are to be added to the former liquor. Into the liquor, when still warm, or, if it shall have cooled, again heated, drop muriatic acid as long as it excites any effervescence. Then strain the liquor, and evaporate it so as to crystallize.

In the materia medica of the Edinburgh College, the car- onate of baryta is introduced, for the purpose of forming the uriate according to the first of these processes; but as that ineral is not very common, and sometimes not to be pro- ured, it became necessary to describe the manner of prepa- ing the muriate from the sulphate. This is, however, at- nded with very considerable difficulties, on account of the ery strong attraction which subsists between the sulphuric cid and baryta.

The sulphate of baryta may be decomposed,

1. By compound affinity, by means of carbonate of potass or muriate of lime.

Carbonate of potass is capable of effecting this decompo- ition, either in the dry or humid way. Klaproth boils six- een ounces of finely powdered sulphate of baryta with 32 unces of purified carbonate of potass, and five pounds of ater, for an hour in a tin-kettle, constantly agitating the ixture, and renewing the water as it evaporates. He then llows it to settle, pours off the fluid, which is a solution of ulphate of potass, and edulcorates the precipitate with lenty of water. He next dissolves the carbonate of baryta, hich it contains, in muriatic acid. The portion of sulphate hich is not decomposed may be treated again in the same anner.

Van Mons mixes equal parts of sulphate of baryta and arbonate of potass with one-fourth of their weight of char- oal, all in powder, and heats the mixture to redness in a rucible. When it cools he washes out the sulphate and ulphuret of potass, with water, then boils the residuum with little potass, and washes it again. The carbonate of ba- yta thus obtained he dissolves in muriatic acid.

But by these methods of decomposing the sulphate of ba- yta, we do not get rid of the metallic substances which it ften contains, and which render the muriate thus prepared nfit for medical use. The metalline muriates may, how- ver, be expelled, according to Westrumb, by heating the nuriate of baryta to redness as long as any fumes arise. The ure salt is then to be dissolved in water, and crystallized. Göttling, with the same intention of getting rid of metalline substances, chooses sulphate of baryta perfectly colourless, and treats it with muriatic or nitro-muriatic acid before he proceeds to decompose it.

La Grange decomposes the sulphate of baryta, by means of dry muriate of lime. He mixes equal parts of this muriate with sulphate of baryta in powder, and projects it by spoonfuls into a crucible previously heated to redness. When it is all in complete fusion, he pours it out upon a polished stone previously heated. The matter, which cracks as it cools, has a whitish grey colour, and is very hard, sonorous, and deliquescent, is now to be boiled in about six times its weight of distilled water, its solution filtered, and the residuum boiled in a smaller quantity of water. The mixed solutions are then evaporated to a pellicle, and on cooling furnish beautiful crystals of muriate of baryta, which are to be washed with cold water, and purified by a second solution and crystallization. The mother water of the first crystallization still contains muriate of baryta, which may be separated from the muriate of lime, with which it is mixed, by repeated solutions and crystallizations. La Grange thinks that this process not only saves time, fuel, and muriatic acid, but that it furnishes a purer muriate of baryta than the following process.

2. By decomposing it by means of charcoal.

At a high temperature charcoal has a greater affinity for oxygen than either sulphur or baryta has; it therefore decomposes both the sulphuric acid and baryta, by depriving them of oxygen, and flies off in the state of carbonic oxide or acid gas, while the sulphur combines with the reduced barium. On adding water to the sulphuret of barium thus formed, new combinations take place. A portion of sulphate of baryta is regenerated, while hydro-sulphuret of baryta remains in solution. This solution is exceedingly prone to decomposition, and must therefore be preserved from the action of the air as much as possible. It also crystallizes by cooling, and therefore should be kept at a boiling heat. On the addition of muriatic acid, there is a violent effervescence and disengagement of sulphuretted hydrogen gas, while very pure muriate of baryta remains in solution. When prepared in this way, it cannot be contaminated with any of the noxious metals, as their compounds with sulphur and hydrogen are not soluble. On this account, it is the process adopted by the Edinburgh College.

Muriate of baryta commonly crystallizes in tables. It has a disagreeable bitter taste; is soluble in three parts of water at 60°, and in less boiling water. It is scarcely soluble in alcohol; and its solution burns with a yellow flame. It crystallizes by evaporation; its crystals are permanent; and by the action of heat decrepitate, dry, and melt. For making a solution, the crystals should be used entire; for when previously powdered, it always turns out turbid. When crystallized, it contains 4.625 acid, 9.75 baryta, and 1.125 water; when dried, 4.5 chlorine, and 8.75 barium. It is decomposed by the sulphates, nitrates, succinates, oxalates, tartrates, and sulphites; and by the alkaline phosphates, borates, and carbonates, and their acids. It is also decomposed by succinate of ammonia, nitrate of silver, acetate, nitrate and phosphate of mercury, acetate of lead, tartrates of iron and antimony, burnt sponge, and Hermbstadt's antimonial tincture, antimonial wine, soap, &c., extracts of gentian, marsh trefoil, and the inspissated juices of aconite, hemlock and hyoscyamus. It is not decomposed by muriate of iron, or corrosive sublimate, and bears the addition of aromatic distilled waters, simple syrups, gum arabic mucilage, some simple extracts, pure opium, and similar substances, when they do not contain astringent matter.

When pure it has no colour; does not deliquesce; does not burn with a red or purple flame, when dissolved in alcohol; and is not precipitated by gallic acid, prussiate of potass and iron, or hydro-sulphuret of ammonia. By washing with alcohol muriate of baryta, rendered impure by the presence of muriate of iron, the latter alone is dissolved.

It is commonly given in solution.

SOLUTIO MURIATIS BARYTÆ. *Ed.*
Solution of Muriate of Baryta.

Take of
Muriate of baryta, one part;
Distilled water, three parts. Dissolve.

THE proportion of water directed here for the solution of muriate of baryta is considerably less than what is stated to be necessary by the writers on chemistry. It is, however, sufficient, even at the lowest ordinary temperatures; a circumstance which should be attended to in making saturated solutions of saline bodies.

Medical use.—Muriate of baryta is generally said, by writers on the materia medica, to be a *stimulant* deobstruent; and yet Hufeland, one of its greatest panegyrists, says that it succeeds better in cases attended with inflammation and increased irritability than with atony and torpor. When given in large doses, it certainly produces nausea, vomiting, diarrhœa, vertigo, and death.

Its effects on a morbid state of the body are also disputed. Some assert that it is of no advantage in any disease; while others bestow upon it the most unqualified praises. By the latter it is principally celebrated,

1. In all cases of scrofula;
2. In obstructions and tumours;
3. In cases of worms;
4. In cutaneous diseases.

The dose of the solution, at first, is five or ten drops twice or thrice a-day, to be gradually and cautiously increased to as much as the patient can bear.

The solution is also used externally as a stimulating and gently escharotic application in cutaneous diseases, fungous ulcers and specks upon the cornea.

CALX. *Lond.*
Lime.

Take of
White marble, one pound.

Break it into bits, and burn it for an hour in a crucible with a violent heat, or until the carbonic acid be totally expelled, so that on dropping on it dilute acetic acid, no air bubbles are formed.

CALX E TESTIS. *Lond.*
Oyster-shell lime.

Lime may be made in the same manner from *oyster-shells.*

LIME is not found in nature, but it is easily procured by the action of fire from any of the abundant carbonates, mineral or animal. For most purposes common lime will do; but as it is seldom pure or totally deprived of its carbonic acid, it may be necessary for the chemist to prepare it himself. Clean oyster-shells afford it in the greatest purity; and as pure lime is not altered by any heat that can be applied, there is no risk of pushing the fire too far. White marble also furnishes a very pure lime. Lime rapidly absorbs water and carbonic acid, and must therefore be kept in small well-corked and sealed bottles.

SOLUTIO CALCIS sive AQUA CALCIS. *Ed.*
Solution of Lime or *Lime Water.*

Take of

Fresh burnt lime, half a pound.

Put it into an earthen vessel, and sprinkle on it four ounces of water, keeping the vessel covered, while the lime grows hot, and falls into powder. Then pour on it twelve pounds of water, and mix the lime thoroughly with the water by agitation. After the lime has subsided, repeat the agitation, and let this be done about ten times, always keeping the vessel covered, that the free access of the air may be prevented. Lastly, let the water be filtered through paper, with glass rods interposed between it and the funnel, that the solution may pass as quickly as possible. It must be kept in very close bottles.

AQUA CALCIS. *Dub.*
Lime Water.

Take of

Lime recently burnt, one pound;
Boiling water, one pint.

Put the lime into an earthen vessel, and sprinkle the water upon it, keeping the vessel shut while the lime grows warm and falls into powder; then pour upon it three gallons of cold water, and close the vessel, agitating it frequently for twenty-four hours; lastly, filter the water through paper, placed in a covered funnel, and keep it in well-closed bottles.

LIQUOR CALCIS. *Lond.*
Solution of Lime.

Take of

Lime, half a pound;
Boiling distilled water, twelve pints.

Pour the water on the lime, and stir them together; immediately cover the vessel, and set it aside for three hours; then preserve the liquor upon the remaining lime in well-corked bottles, and decant off the limpid solution when wanted for use.

WE have already had occasion to speak of the properties f lime, and shall therefore now confine our remarks to the olution of it in water, commonly called Lime-water. This s made in two ways. The more common, that of the Edinurgh and Dublin Colleges, is to add at first only so much water as is sufficient to slake the lime, which reduces it to a fine powder, easily diffused through water; and then to dissolve the slaked lime in water.

The London College, without previously slaking the lime, pour on the whole quantity of water at once. During the whole process, the air must be excluded as much as possible, as lime-water has a very strong affinity for carbonic acid, and attracts it from the atmosphere. The proportion of water used is scarcely able to dissolve one-tenth of the lime; but lime is of little value; and our object is to form a saturated solution quickly and easily. Lime is actually more soluble in cold water than in hot: therefore it is unnecessary to use boiling water. The Edinburgh and Dublin Colleges filter their solutions; and if we use the precautions directed, it may be performed without the lime absorbing a perceptible quantity of carbonic acid.

The London College do not filter, but decant off their solution, and if carefully performed it will be perfectly pure; and the directions given by them, of keeping their lime-water upon an excess of lime, is certainly an advantage, as we are sure of its being always saturated, for fresh lime will be always dissolved to supply the place of that rendered insoluble, and precipitated by the absorption of carbonic acid.

The bottles in which lime-water is kept should be perfectly full, and well corked.

Lime-water is transparent and colourless. It has an austere acrid taste, and affects vegetable colours as the alkalies do. Good lime-water is precipitated white by alkaline subcarbonates, and orange by corrosive sublimate. It enters very readily into combination with all the acids, sulphur, and phosphorus, and decomposes the alkaline carbonates, phosphates, fluates, borates, oxalates, tartrates, and citrates, the ammoniacal acetates, muriates and succinates, the sulphates of alumina and magnesia, the metallic salts, spiritous liquors, and astringent substances.

Pharm. use.—Lime-water is used as a solvent in the compound lime-water, to form a soap in the liniment of lime-water, and to precipitate the protoxide of mercury from calomel.

Medical use.—When applied to the living fibre, lime-water corrugates and shortens it; it therefore possesses astringent powers. It is also a powerful antacid, or at least it combines with, and neutralizes acids when it comes in contact with them. It also dissolves mucus, and kills intestinal worms. From possessing these properties, it is used in medicine, in diseases supposed to arise from laxity and debility of the solids, as diarrhœa, diabetes, leucorrhœa, scrofula, and scurvy; in affections of the stomach accompanied with acidity and flatulence; when the intestines are loaded with mucus; and in worms. Lime-water is scarcely capable of dissolving, even out of the body, any of the substances of which urinary calculi consist; it has therefore no pretensions to the character of a lithontriptic. It has been also recommended in porrigo larvalis, in cancer, and in chronic cutaneous diseases. Externally, it is applied to ill-conditioned ulcers, gangrenous sores, as a wash in porrigo capitis and scabies; and as an injection in gonorrhœa, fistulas, and ulcers of the bladder.

When taken internally, its taste is best covered by lukewarm milk. Its dose is commonly from two to four ounces, frequently repeated; but when long continued, it weakens the organs of digestion.

CARBONAS CALCIS PRÆPARATUS. *Ed.*
Prepared Carbonate of Lime.

Carbonate of lime, after having been triturated to powder in an iron mortar, and levigated on a porphyry stone with a little water, is to be put into a large vessel, and water to be poured upon it, which, after agitating the vessel repeatedly, is to be decanted off, while loaded with minute powder. On allowing the water to settle, the subtile powder will subside, which is to be dried.

The coarse powder which the water could not suspend may be levigated again, and treated in the same manner.

CRETA PRÆPARATA. *Lond.*
Prepared Chalk.

Take of
Chalk, one pound.

Add a little water to the chalk, and triturate it to fine powder. Throw this into a large vessel filled with water, then agitate them, and after a short pause decant off the supernatant liquid, still turbid, into another vessel, and set it aside, that the powder may subside. Lastly, having poured off the water, dry this powder.

TESTÆ PRÆPARATÆ. *Lond.*
Prepared Oyster Shells.

Wash, in boiling water, the shells previously well cleansed, then prepare them in the same manner as chalk is prepared.

CRETA PRÆPARATA. *Dub.*
Prepared Chalk.

Grind it to powder in an earthen-ware mortar, with the addition of a little water; then mix it with a sufficient quantity of water by agitation; and after allowing it to stand a little, until the coarser particles fall to the bottom, pour off the liquor. This may be frequently repeated, triturating previously each time. Finally, the very fine powder, which, after some time, will subside in the decanted liquor, is to be collected and dried upon a bibulous stone or paper.

OSTREARUM TESTÆ PRÆPARATÆ, *D.* *Prepared Oyster Shells,*
OVORUM TESTÆ PRÆPARATÆ, *D.* *Prepared Egg Shells,*
Are to be prepared in the same manner as chalk.

THE preparation of these substances merely consists in reducing them to an impalpable powder.

Medical use.—Carbonate of lime is commonly called an absorbent earth. It certainly is an antacid; that is, it combines with and neutralizes most acids, while its carbonic acid is expelled in the form of gas. It is therefore exhibited in affections of the stomach accompanied with acidity, especially when at the same time there is a tendency to diarrhœa. The fear of its forming concretions in the bowels is probably imaginary; for it is not warranted either by theory or experience.

Applied externally, carbonate of lime may be considered as an absorbent in another point of view; for its beneficial action on burns and ulcers probably arises entirely from its imbibing the moisture or ichorous matter, as a sponge would do, and thus preventing it from acting on the abraded surfaces, and excoriating the neighbouring parts.

CRETA PRÆCIPITATA. *Dub.*
Precipitated Chalk.

Take of

Water of muriate of lime, any quantity.

Add as much carbonate of soda, dissolved in four times its weight of distilled warm water, as is sufficient to precipitate the chalk. Wash the matter which falls to the bottom, three times, by pouring on, each time, a sufficient quantity of water. Lastly, having collected it, dry it upon a chalk stone or paper.

THIS preparation affords carbonate of lime in its purest state, and, although expensive, may be employed when it is intended for internal use. By calculation 11.25 of carbonate of soda decompose 14.875 crystallized muriate of lime.

CALCIS MURIAS. *Lond.*
Muriate of Lime.

Take of
The salt which remains after the distillation of the subcarbonate of ammonia, two pounds;
Water, one pint.
Dissolve and filter through paper. Evaporate the liquor until the salt be rendered dry. Keep this in a well-closed phial.

LIQUOR CALCIS MURIATIS. *Lond.*
Liquor of Muriate of Lime.

Take of
Muriate of lime, two ounces;
Distilled water, three fluidounces.
Dissolve the muriate of lime in the water, then filter through paper.

SOLUTIO MURIATIS CALCIS. *Ed.*
Solution of Muriate of Lime.

Take of
Hard carbonate of lime, that is, white marble, broken into pieces, nine ounces;
Muriatic acid, sixteen ounces;
Water, eight ounces.
Mix the acid with the water, and gradually add the pieces of carbonate of lime. When the effervescence has ceased, digest them for an hour, pour off the liquor and evaporate it to dryness. Dissolve the residuum in its weight and a half of water, and, lastly, filter the solution.

AQUA MURIATIS CALCIS. *Dub.*
Water of Muriate of Lime.

Take of
Chalk, in coarse powder, one ounce;
Diluted muriatic acid, two ounces.
Gradually add the chalk to the acid, and, after the effervescence is finished, filter.

FROM the difficulty of crystallizing muriate of lime, it is directed by the Edinburgh College to be evaporated to the total expulsion of its water of crystallization, as being the surest way of obtaining a solution of uniform strength. With the same view, the Dublin College saturate muriatic acid of a given strength; and Dr Wood directs, that the solution should always have a determinate specific gravity. Muriate of lime may be economically prepared from the residuum in the decomposition of muriate of ammonia, by lime or chalk, according to the directions of the Berlin Pharmacopœia, by watery fusion, solution, filtration, and crystallization. Its purity is ascertained by its remaining colourless and transparent, with infusion of galls and caustic ammonia; a brown colour indicating the presence of iron, and a precipitation that of alumina. But it may be purified by boiling it in solution, with a sufficient quantity of pure chalk, or other carbonate of lime, filtrating it, evaporating it gently, till it acquire the specific gravity of 1.5, allowing it to stand some days in a corked bottle, decanting it carefully from the sediment, and duly evaporating it.

The crystals of this salt are prisms of six smooth and equal sides, but they are often so aggregated, that they can only be termed acicular. Its taste is pungent, bitter, and disagreeable. When heated, it melts, swells, and loses its water of crystallization. It is very deliquescent, and is so soluble, that water seems capable of dissolving twice its weight, or, at least, forms with it a viscid liquor; but as it is still capable of attracting moisture from the air, and of emitting caloric, when farther diluted, it can scarcely be considered as a true solution. It is also soluble in an equal weight of boiling alcohol, and its solution burns with a crimson flame. It is decomposed by the sulphuric, nitric, oxalic, tartaric, succinic, phosphoric, fluoric, and boracic acids; by baryta, potass, soda, and strontia; by carbonated, sulphated, phosphated, tartrated, acetated alkalies; superoxalate of potass, sub-borate of soda, boro-tartrate of potass and soda, tartrate of potass and soda, succinate of ammonia, alum, sulphate of magnesia, nitrate of silver, nitrate, phosphate, and acetate of mercury, acetate of lead, and sulphate of iron, copper and zinc. Crystallized, it contains 4.625 acid, 3.5 lime, and 6.25 water, = 14.875; dried at a red heat, 4.5 chlorine, and 2.5 calcium, = 7.

Pharm. use.—Muriate of lime is employed to make precipitated carbonate; and its strong affinity for water and alcohol fits it for the rectification of alcohol and of ether.

Medical use.—It was first proposed as a medicine by Fourcroy, and has been since extolled in scrofulous and glandular diseases, and cases of debility in general, by several eminent practitioners of our own country, Dr Beddoes, Dr R.

Pearson, and Dr Wood. Thirty drops of the solution are a sufficient dose for children, and a drachm for adults, repeated twice or thrice a-day. In an over-dose, it has produced qualms and sickness; and three drachms and a half killed a dog, the stomach of which, upon dissection, had its villous coat bloodshot, and in many parts almost black, and converted into a gelatinous slime. The property of this salt, of producing intense cold during its solution, might also be applied to medical use.

CORNU USTUM. *Lond.*
Burnt Horn.

Burn pieces of horn in the open fire, until they become perfectly white; then reduce them to powder, and prepare it in the same manner as is directed for chalk.

PULVIS CORNU CERVINI USTI. *Dub.*
Powder of Burnt Hartshorn.

Burn pieces of hartshorn till they become perfectly white; then reduce them to a very fine powder.

THE pieces of horn generally employed in this operation are those left after distillation. In the burning of hartshorn, a sufficient fire, and the free admission of air are necessary. The potter's furnace was formerly directed, for the sake of convenience; but any common furnace or stove will do. Indeed, too violent a heat makes their surface undergo a kind of fusion and vitrification, which both prevents the internal parts from being completely burnt, and renders the whole less soluble. If the pieces of horn be laid on some lighted charcoal, spread on the bottom of the grate, they will be burnt to whiteness, still retaining their original form.

According to the analysis of Merat Guillot, hartshorn consists of 27. gelatin, 57.5 phosphate of lime, 1. carbonate of lime, and there was a loss of 14.5, probably water. Now, as the gelatin is destroyed by burning, and the water expelled, the substance which remains is phosphate of lime, mixed with less than two *per cent.* of carbonate of lime. Fourcroy and Vauquelin have analysed bones more accurately, and found that they contain also phosphate of magnesia, iron, and manganese. In human bones there are also traces of alumine and silex.

Medical use.—From its white earthy appearance, the powder of burnt bone was formerly considered as an absorbent earth. But since its composition has been ascertained, that idea has been laid aside, and its use has been suggested as a remedy in rickets, a disease in which the deficiency of the natural deposition of phosphate of lime in the bones seems to be the essential, or, at least, the most striking symptom. Mr Bonhomme, therefore, gave it to the extent of half a scruple, mixed with phosphate of soda, in several cases with apparent success. Whatever objections may be made to the theory, the practice certainly deserves a trial.

MAGNESIA. *Ed.*
Magnesia.

Let carbonate of magnesia, put into a crucible, be kept in a red heat for two hours; then put it up in close-stopt glass vessels.

Lond.

Take of
Carbonate of magnesia, four ounces.
Burn it with a very fierce fire for two hours, or until acetic acid dropped upon it cause no effervescence.

MAGNESIA USTA. *Dub.*
Calcined Magnesia.

Take of
Magnesia, any quantity.
Expose it to a strong heat in a crucible, for two hours; and, when cold, put it into a glass vessel.

By this process the carbonate of magnesia is freed of its acid and water; and, according to the late Dr Black's experiments, loses about $\frac{7}{12}$ of its weight. A kind of opaque, foggy vapour is observed to escape during the calcination, which is nothing else than a quantity of fine particles of magnesia, buoyed off along with a stream of the disengaged gas. About the end of the operation, the magnesia exhibits a kind of luminous or phosphorescent property, which may be considered as a pretty exact criterion of its being deprived of its acid.

Another mode of obtaining caustic magnesia is by precipitating the sulphate by a solution of potass; and it is supposed that in this way Henry's magnesia is prepared, it differs so much in volume and sp. gr. from that prepared by heat.

It must be kept in close vessels, because it attracts, though slowly, the carbonic acid of the atmosphere. Although scarcely soluble in water, by the experiments of Dr Fyfe, it is less soluble in boiling than in cold water. Its sp. gr. is 2.33, and when sprinkled with water, heat is produced, and it absorbs 18 *per cent.* Magnesia decomposes alum, borax, tartrate and succinate of ammonia, tartrate of potass, tartrate of potass and soda, and all the officinal metallic salts.

Medical use.—It is used for the same general purposes as the carbonate. In certain affections of the stomach, accompanied with much flatulence, magnesia is preferable, both because it contains more magnesia in a given bulk, and, being deprived of its acid, it neutralizes the acid of the stomach, without any extrication of gas, which is often a troublesome consequence when carbonate of magnesia is employed in these complaints.

CARBONAS MAGNESIÆ. *Ed.*
Carbonate of Magnesia.

Take of
Sulphate of magnesia, four parts;
Subcarbonate of potass, three parts;
Boiling water, a sufficient quantity.

Dissolve the salts separately in twice their weight of the water, and let the liquors be strained, or otherwise freed from their fæces; then mix them, and instantly add eight times their weight of boiling water. Let the liquor boil for a little on the fire, stirring it at the same time; then let it rest till the heat be somewhat diminished; after which strain it through linen; the carbonate of magnesia will remain upon the cloth, and is to be well washed with pure water, and afterwards dried with a gentle heat.

Lond.

Take of
Sulphate of magnesia, one pound;
Subcarbonate of potass, nine ounces;
Water, three gallons.

Dissolve separately the subcarbonate in three pints of the water, and the sulphate in five, and filter. Then add the rest of the water to the solution of the sulphate; boil it, and, while it is boiling, mix with it, under constant stirring, the solution of the subcarbonate, and filter through linen. Lastly, wash the powder with repeated affusions of boiling water, and dry upon blotting paper, with a heat of 200°.

MAGNESIA. *Dub.*
Magnesia.

Take of
  Sulphate of magnesia,
  Subcarbonate of kali, of each two pounds;
  Boiling water, twenty pints.

Dissolve the sulphate of magnesia and the kali, each in ten pounds of water. Mix the defæcated liquors. Boil the mixture a little, and, while still warm, filter it through linen, stretched, so as to fit it for collecting the magnesia. Wash off the sulphate of kali, by repeated affusions of boiling water; and, lastly, dry the magnesia.

SULPHATE of magnesia consists of 5 acid, 2.5 base, and 7.875 water = 15.375. Salt of tartar of 5.5 acid, 6 base, and 1.125 water = 12.625, which quantities mutually decompose each other; but the salt of tartar is often moist and partially converted into sesquicarbonate, of which 16.875 are necessary for the total decomposition of the sulphate. The product from 15.375 sulphate should be 8.625 anhydrous carbonate of magnesia; but this is not the state in which it occurs in the shops.

The officinal carbonate of magnesia is prepared by mixing together concentrated and hot solutions of the sulphate of magnesia and carbonate of potassa. The potass unites itself to the sulphuric acid, while the carbonic acid combines with the magnesia, to form subcarbonate of magnesia. The precipitate is said to turn out lighter and whiter, the less water there is used in its preparation. The large quantity of water ordered by the colleges is intended for the solution of the sulphate of potass formed; and the boiling heat is indispensably requisite for the expulsion of a portion of the carbonic acid, which, in consequence of the alkali being partly in the state of sesquicarbonate, is furnished in excess by the alkali, and would otherwise retain a part of the magnesia in solution. 100 parts of dry salt of tartar are sufficient for the decomposition of 125 parts of sulphate of magnesia; and, from these quantities, about 45 parts of carbonate of magnesia are obtained.

The ablutions should be made with very pure water. Hard water, for this process, is peculiarly inadmissible, as the principle in waters, giving the property called *hardness*, is generally a salt of lime, which decomposes the carbonate of magnesia by compound affinity, giving rise to carbonate of lime, while the magnesia unites itself to the acid of the calcareous salt, by which the quantity of the magnesia is not only lessened, but is rendered impure by the admixture of carbonate of lime. Another source of impurity is the silica, which the subcarbonate of potass generally contains. It is most easily got rid of by exposing the alkaline solution to the air for several days before it is used. In proportion as it is converted into sesquicarbonate, the silica is precipitated, and may be separated by filtration.

In the preparation of the subcarbonate of magnesia, the Berlin College order subcarbonate of soda to be used, which has the advantage of forming with the sulphuric acid of the sulphate of magnesia a much more soluble salt than the sulphate of potash.

The carbonate of magnesia of commerce is also prepared from the muriate of magnesia, which remains in solution after the crystallization of muriate of soda from sea-water.

The carbonate of magnesia, thus prepared, is a very light, white, opaque substance, without smell or taste, almost insoluble in water, effervescing with acids. Its composition differs according to its mode of preparation. Berzelius found it to consist, after being thoroughly washed with boiling water, of 44.58 magnesia, 35.7 acid, and 19.72 water; and he considers it as a compound of 3 primes of carbonate of magnesia and 1 of quadrohydrate. Bucholz prepares two varieties; a *lighter*, with 8 lbs. avoird. of sulphate of magnesia dissolved in 48 lbs. of pure cold water, and 13 lbs. 6 oz. of carbonate of soda dissolved in twice its weight of cold water, and the precipitate washed two or three times with 8—12 times as much cold water; and a *heavier*, with 8 lbs. of sulphate dissolved in 48 lbs. boiling water, and 9 lbs. 6 oz. carbonate of soda dissolved in 18 lbs. boiling water, and kept boiling for 15 minutes after being mixed. The light variety is extremely spongy and light, is somewhat coherent, and has a fine feel like starch; it contains 32 acid, 33 base, and 35 water. The heavy variety has no cohesion, is evidently heavier, and feels granular like fine sand. It contains 35 acid, 42 base, and 23 water.

Subcarbonate of magnesia is decomposed by all the acids, potass, soda, baryta, lime, and strontia, the sulphate, phosphate, nitrate, and muriate of alumina, and the superphosphate of lime.

A solution of supercarbonate of magnesia, prepared in imitation of the supercarbonate of soda, has been lately introduced into commerce, which answers very well the purposes for which it is adapted.

Medical use.—Carbonate of magnesia is principally given to correct acidity of the stomach, and, in these cases, to act as a purgative: for solutions of magnesia in all acids are bitter and purgative, while those of the other earths are more or less austere and astringent. A large dose of magnesia, if the stomach contain no acid to dissolve it, neither purges nor produces any sensible effect; a moderate one, if an acid be lodged there, or if acid liquors be taken after it, procures several stools; whereas carbonate of lime, in the same circumstances, instead of loosening, binds the belly. When the carbonate of magnesia meets with an acid in the stomach, there is extricated a considerable quantity of carbonic acid gas, which sometimes causes uneasy distention of the stomach, and the symptoms of flatulence. In such cases, therefore, magnesia is preferable to its carbonate; but, on other occasions, as in nausea and vomiting, good effects arise from the action of the gas evolved. It is also used against the lithic diathesis, when it depends upon the tendency to generate uric acid.

ALUMEN EXSICCATUM. *Ed.*
Dried Alum.

Melt alum in an earthen or iron vessel, and keep it over the fire until it cease to boil. Then powder it.

ALUMEN EXSICCATUM. *Lond.*
Dried Alum.

Melt alum in an earthen pot over the fire, and increase the heat until the ebullition cease.

ALUMEN USTUM. *Dub.*
Burnt Alum.

Take of
Alum, any quantity.
Expose it in an earthen vessel to a strong fire, until it cease to boil.

THE vessel in which this process is conducted must contain at least three times as much as the bulk of the alum operated on, as this swells exceedingly in melting, and would otherwise run over.

Mr Chaptal found, that by exsiccation in a red heat, alum of his own manufacture lost 0.67, Roman alum 0.50, English alum 0.47, and Levant alum only 0.40. These differences arise principally from different proportions of water of crystallization, but also from an excess of alumina, which the last contains.

According to Kirwan, crystallized alum consists of 17.66 acid, 12 alumina, and 70.24 water, and alum desiccated at 700°, of 36.25 acid, and 63.75 basis, by which it would appear, that at that heat it loses not only all its water, but also more than half its acid, or is converted into a subsulphate.

Med. use.—Dried alum is only applied externally, as a gentle escharotic to fungous ulcers.

CHAP. V.—METALLINE PREPARATIONS.

ANTIMONY.

SULPHURETUM ANTIMONII PRÆPARATUM. *Ed.*

Prepared Sulphuret of Antimony.

Powder sulphuret of antimony in an iron mortar, levigate it upon a porphyry stone with a little water, and put it into a large vessel: Then pour upon it water which is to be decanted off loaded with the fine powder, by frequently agitating the vessel. On allowing the water to settle, the powder will subside, and is then to be dried.

The coarse powder, which the water could not suspend, is to be again levigated and treated in the same way.

Dub.

Reduce it to powder, and separate for use the impalpable particles, in the manner directed for the preparation of chalk.

By reducing the sulphuret of antimony to the state of an impalpable powder, it is both rendered much more active, and is prevented from irritating the stomach mechanically, of which there would be some danger, from the sharpness of its spiculæ. Even in this state, however, it is not a very certain remedy. In general, it operates very mildly; but sometimes it becomes more active, producing vomiting and hypercatharsis. And Buchner found, that when long exposed to the air after being powdered, it was partially oxidized, and formed some tartar-emetic when boiled with a solution of cream of tartar.

Pharm. use.—Sulphuret of antimony is the raw material, from which all the preparations of antimony are prepared.

Med. use.—It is principally given in scrofula, glandular obstructions, cutaneous diseases, and rheumatism. Its dose is from 10 to 30 grains, and upwards; and it is best exhibited in the form of a powder or bolus. It seems to constitute a quack remedy, which has acquired some reputation in Ireland for the cure of cancer. It is used externally for dressing the sore.

SULPHURETUM ANTIMONII PRÆCIPITATUM. *Ed.*
Precipitated Sulphuret of Antimony.

Take of
- Water of potass, four pounds;
- Water, three pounds;
- Prepared sulphuret of antimony, two pounds;
- Dilute sulphuric acid, a sufficient quantity.

Mix the sulphuret with the solution of potass and the water, then boil them in a covered iron pot, over a slow fire, for three hours, adding more water, if necessary, and frequently stirring the mixture with an iron spatula; strain the liquor, while warm, through a double linen cloth, and add to it, when filtered, as much of the acid as is necessary to precipitate the sulphuret, which must be well washed with warm water.

Lond.

Take of
- Sulphuret of antimony, in powder, two pounds;
- Solution of potass, four pints;
- Distilled water, three pints.

Mix and boil, with a gentle fire, for three hours, constantly stirring, and adding, from time to time, as much distilled water as to keep up the original quantity. Quickly filter the solution through double linen, and gradually drop into it, when still hot, as much diluted sulphuric acid as may precipitate it; then wash away the sulphate of potass with warm water; dry the precipitated sulphuret of antimony and triturate it to powder.

SULPHUR ANTIMONIATUM FUSCUM. *Dub.*
Brown Antimoniated Sulphur.

Take of
- Prepared sulphuret of antimony.
- Subcarbonate of kali, each one ounce.

Melt them, previously mixed, in a crucible. Powder the mass when cold. Put it into a matrass, with four pints of water, and boil for a quarter of an hour. Remove the vessel from the fire, and cover it; let it rest a little, and, as soon as the liquor has become limpid, decant it cautiously from the sediment. The antimoniated sulphur will, in part, be separated by the cooling of the liquor: add a sufficient quantity of diluted sulphuric acid to precipitate the whole of it, which happens with excess of acid; agitate the mixture, that what is last thrown down (which is of an orange colour) may be mixed with the rest. After allowing it to stand a sufficient time, pour the liquor from the sediment, which is to be washed with cold water, as long as it affects litmus paper. Lastly, dry it upon blotting paper.

THE most accurate analysis of *Kermes Mineral* is by Buchner, who states it to consist of sulphuret of antimony 52.5; protoxide of antimony 27.5; water chemically united 5, hygroscopically 15 = 100; or nearly one prime of protoxide of antimony, and two primes of sulphuret of antimony, with four primes of water, three of which are hygroscopical, and may be expelled by a gentle heat, without altering the nature of the substance, and one chemically combined, requiring a red heat for its expulsion. Buchner thinks that the sulphuret of antimony here acts as an acid, and he has given it the name of Stibiothionic acid, and that Kermes mineral is a stibiothionate of antimony in the state of a hydrat.

When, according to the direction of the Dublin College, sulphuret of antimony and salt of tartar are melted together, a mass is obtained which was formerly called *Hepar Antimonii.* The crucible employed for the fusion should be large, and not filled more than two-thirds, as the matter swells and boils up. This is owing to the carbonic acid which is driven off. At the same time great part of the alkali is reduced, and a portion of the sulphur is acidified by the oxygen, and so much potass will remain undecomposed, or so much oxide of antimony will be formed, as to saturate this acid. But the product consists chiefly of sulphur united with the two metallic bases, potassium and antimony. When well prepared it forms a red brown mass, without smell when dry, but smelling of rotten eggs when moistened, of a nauseous and acrid sulphureous taste, and in very small doses producing vomiting and purging. It is deliquescent in the air, and almost totally soluble in water, forming a dark brown solution. If boiling water be employed, an orange brown precipitate is deposited as it cools, but the solution is still dark coloured. During the solution water is decomposed;

all the potassium and antimony are oxidized, and the sulphur forms hydrothionic acid with the oxygen, and the solution thus contains hydrothionate of potass and antimony.

In the processes of the London and Edinburgh Colleges, a similar solution is prepared *via humida.* When the sulphuret of antimony is boiled with a solution of potass, water is decomposed, the oxygen unites with the antimony to form its protoxide, and the hydrogen with the sulphur to form hydrothionic acid, which unites with both bases. On cooling Kermes mineral separates and subsides; and Buchner states there remains in the solution sulphuret of antimony dissolved in the alkaline ley by hydrothionic acid. When an acid is added to this solution, the sulphuretted hydrogen is expelled, and a red powder is precipitated, which consists of sulphuret of antimony 90, and water 10. Buchner does not expressly state the nature of the precipitate, when, according to the directions of the British Colleges, the acid is added to the hot solution before any precipitation from cooling takes place; but we may infer that it contains no protoxide of antimony, and is merely the hydrated sulphuret; for, when speaking of the *sulphur auratum antimonii,* he says, " It might be thought that this preparation also contains protoxide of antimony, as the Kermes does; but this is not the case, for the sulphuretted hydrogen set free by the addition of the acid, immediately disoxydizes it, and water and sulphuret of antimony are produced."

If Buchner's view be on the whole correct, we see that the Kermes obtained by precipitation with an acid is a very different substance, and much less active than that which is spontaneously deposited on cooling, as directed in the foreign pharmacopœias; and it may not therefore be superfluous to give a formula for its preparation. Boil two pounds of crystallized subcarbonate of soda, dissolved in twenty pounds of water, for half an hour, in an iron kettle, with an ounce of levigated sulphuret of antimony, and filter the solution into a heated vessel to cool slowly. After deposition, the precipitate is to be separated by filtration, and dried on bibulous paper. The filtered solution may be employed to dissolve another quantity of sulphuret of antimony. Cluzel found that the Kermes is not nearly so beautiful when subcarbonate of potass is used.

The golden sulphuret of antimony agrees more nearly with the precipitated sulphuret of antimony than with the true Kermes, in as much as it contains no protoxide. It may be considered as a bisulphuret of antimony in the state of hydrat, but it may contain still more sulphur. Geiger found it to consist of sulphuret of antimony 73, sulphur 16, and water and loss 11, being very nearly one prime of antimony, two of sulphur, and one of water.

Medical use.—In its action on the body, the hydrosulphuret of antimony is an active substance, and, according to the dose, operates as a diaphoretic, cathartic, or emetic. Its use is, in this country, in a great degree superseded by more certain preparations.

OXYDUM ANTIMONII NITRO-MURIATICUM. *Dub.*

Nitro-Muriatic Oxide of Antimony.

Take of

Prepared sulphuret of antimony, two ounces ;
Muriatic acid, eleven ounces, by measure ;
Nitrous acid, one drachm by measure.

Add the sulphuret gradually to the acids, previously mixed in a glass vessel, avoiding the vapours. Digest with a heat gradually increased, until the effervescence cease, and then boil for one hour. Filter the liquor when cold, and receive it when filtered in a gallon of water. The oxide of antimony will fall to the bottom. Wash this repeatedly in a sufficiently large quantity of water, until the liquor poured off be perfectly free from acid, as known by the test of litmus ; and, lastly, dry the oxide upon bibulous paper.

When sulphuret of antimony is acted upon by muriatic acid, assisted by heat, water is decomposed, sulphuretted hydrogen gas is evolved, and muriate of antimony remains in solution.

When this solution is diluted with water beyond a certain degree, it is decomposed, a white powder formed of minute acicular crystals is precipitated, probably a dichloride formed of one prime chlorine 4.5, and two primes antimony 11 = 15.5, and there remains a bimuriate in solution ; the former of which is the preparation of the Dublin College, formerly called Pulvis Algarothi, for the small addition of nitric acid has no effect on the nature of the product.

If instead of decomposing the muriatic solution by water, it is poured into a solution of an alkaline carbonate, then the whole of the antimony is thrown down in the form of a pale yellow smooth powder, the protoxide of antimony.

Chloride of antimony was first prepared by distilling sulphuret of antimony with corrosive sublimate. Butter of antimony as it was called, from its appearance when recently prepared, passes over into the receiver, and black sulphuret of quicksilver remains in the retort; or by increasing the heat red sulphuret of mercury, which, when obtained by this process, was formerly termed Cinnabar of antimony, is sublimed But this mode of preparation is both expensive and dangerous to the health of the operator.

Scheele invented a method of avoiding these inconveniences, upon which various improvements have since bee made, and lastly by Göttling, who introduces into a retort mixture of four ounces of glass of antimony in powder, wit sixteen of muriate of soda, and then pours into it twelv ounces of sulphuric acid, diluted with eight of water. H lutes on a tubulated receiver with gypsum, and distils t dryness in a sand-bath, with a heat gradually increased. B this process, he says, about twenty ounces of very stron fuming solution of muriate of antimony are obtained. Th residuum in the retort is sulphate of soda, but unfit for internal use, on account of its being mixed with some antimony.

Muriate of antimony, or Chloride of antimony as it is no called, is crystallizable, but in general is a soft semitransparent substance, of a yellowish-white colour, very fusibl and volatile at a moderate degree of heat. It is remarkabl deliquescent, and forms a permanent solution. Chloride o antimony consists, according to the experiments of Dr Joh Davy, of 56 antimony and 44 chlorine, or of one proportion of antimony and one of chlorine.

Pharmaceutic use.—The Submuriate is used by the Dubli College for preparing tartar-emetic.

Med. use.—Muriate of antimony has been used as a caustic, but not for a long time; it is so unmanageable. It i now only prepared as preliminary to the precipitation of th submuriate of oxide of antimony from it.

OXIDUM ANTIMONII CUM PHOSPHATE CALCIS. *Ed.*
Oxide of Antimony, with Phosphate of Lime.

Take of

Sulphuret of antimony, in coarse powder;
Shavings of hartshorn, equal weights.

Mix and put them in a shallow iron pot, red-hot, and sti the mixture constantly, until it become of an ash-grey colour, which is then to be removed from the fire, groun into powder, and put into a coated crucible. Lute to thi crucible another inverted over it, and perforated in th bottom with a small hole, and apply the fire, which is t be raised gradually to a white heat, and kept in that increased state for two hours. Lastly, grind the matter, when cold, into a very fine powder.

PULVIS ANTIMONIALIS. *Dub.*
Antimonial Powder.

Take of
Sulphuret of antimony, in coarse powder;
Shavings of hartshorn, of each two pounds.

Boil the hartshorn in a sufficient quantity of water, to separate the animal jelly. Then dry it, and mix it with the antimony. Throw the mixture into a wide iron pot, heated to redness, stirring continually until the sulphureous vapour cease, and the mass acquire an ash-grey colour. When cold, reduce it to powder, and put it into a luted crucible. Invert another crucible, having a small hole in its bottom, over this, and lute them accurately together. Roast the powder for two hours, with a heat gradually increased to whiteness, and, when cold, grind it to a very fine powder.

Lond.

Take of
Sulphuret of antimony in powder, one pound;
Horn-shavings, two pounds.

Mix, and throw them into a wide crucible, heated to whiteness, stirring them assiduously until no visible vapours ascend, powder the residuum, and put it into a fit crucible. Then apply heat, and gradually increase it, until it be kept white for two hours. Triturate the residuum into a very subtile powder.

THIS is supposed to be nearly the same with the celebrated nostrum of Dr James, which, according to the analysis of Dr George Pearson, confirmed by Mr Phillips, consists of 43 phosphate of lime, and 57 oxide of antimony.

By burning sulphuret of antimony and shavings of hartshorn in a white heat, the sulphur is entirely expelled, and the antimony is oxidized, while the gelatin of the hartshorn is destroyed, and nothing is left but phosphate of lime, combined with a little lime. Therefore, the mass which results is a mixture of oxide of antimony and phosphate of lime. Mr Phillips analysed two specimens, the one of which contained 35, and the other 38 *per cent.* of peroxide of antimony, and 65 and 62 phosphate of lime, respectively. Mr Brande says, that he has generally found a greater discordance, and sometimes as much as 5 *per cent.* protoxide of antimony, which will account for the great diversity of effects ascribed to this preparation.

In the London and Dublin Pharmacopœias, twice the proportion of hartshorn shavings is used, which is said to obviate the inconvenience of the vitrification of part of the antimony when too high a temperature was applied, to render the process more manageable, and to furnish a whiter product; but the product does not correspond with Dr Pearson's analysis of James's powder, for which it was intended as a substitute, and the strength of an established preparation is materially altered.

Mr Chenevix, by considering the uncertainty of the application, and the precarious nature of the agency of fire, by which means a variable portion of the oxide of antimony may be volatilized, and that which remains may be oxidized in various degrees, proposes to prepare a substitute for James's powder, by dissolving together equal weights of submuriate of antimony and of phosphate of lime, in the smallest possible quantity of muriatic acid, and then pouring this solution gradually into water sufficiently alkalized with ammonia. As muriate of antimony is partially decomposed by water, it is absolutely necessary that the muriatic solution be poured into the alkaline liquor; for, by an opposite mode of procedure, a great part of the antimony would be precipitated in the state of submuriate, and the first portion of the precipitate would consist chiefly of antimony and the last of phosphate of lime.

Phosphate of lime is most conveniently obtained pure by dissolving calcined bone in muriatic acid, and precipitating it by ammonia. If the ammonia be quite free from carbonic acid, no muriate of lime is decomposed. Mr Chenevix also found, that this precipitate is entirely soluble in every acid which can dissolve either phosphate of lime or oxide of antimony separately, and that about 0.28 of James's powder, and, at an average, 0.44 of the pulvis antimonialis of the London Pharmacopœia, resist the action of every acid. Mr Brande does not approve of this preparation, as the precipitate is apt to get horny or gritty and difficult to powder.

Medical use.—The oxide of antimony with phosphate of lime, howsoever prepared, is one of the best antimonials we possess. It is given as a diaphoretic in febrile diseases, in doses of from three to eight grains, repeated every third or fourth hour. In larger quantities, it operates as a purgative or emetic. Its effects seem however to vary much, perhaps from idiosyncrasy of constitution or variety of the preparation. Mr Hawkins gave ʒ i morning and evening without any obvious effect, and I have given ℈ i. and ʒſs doses, repeated several times a-day, without inducing vomiting or purging. From its being insoluble in water, it must be given either in the form of a powder, or made into a pill or bolus.

TARTRAS ANTIMONII, *olim* TARTARUS EMETICUS. *Ed.*
Tartrate of Antimony, formerly *Tartar-Emetic*.

Take of
Sulphuret of antimony,
Nitrate of potass, equal weights;
Supertartrate of potass, what may be required.

Powder the sulphuret and nitrate separately, mix them thoroughly, and inject them into a hot crucible. After the deflagration is finished, separate the reddish matter obtained from the white crust, and grind it to a very fine powder, which is afterwards to be washed with much warm water, and then dried.

Mix this powder by trituration, with an equal weight of supertartrate of potass, and boil the mixture with four times its weight of water for an hour, and evaporate the filtered solution so as to crystallize.

THE first part of this process is that formerly directed for the preparation of what was formerly called Crocus of antimony, which is no longer ordered as a separate process, and therefore must be spoken of in this place.

In this process, the nitric acid of the nitre, and part of the sulphuret, are mutually decomposed: the sulphur is acidified, and combines with the potass of the nitre, while the antimony is converted into protoxide, which combines with the undecomposed portion of the sulphuret, and forms a dark brown, opaque, vitrified mass; so that, after the scoriæ, and other saline matters, have been removed by washing, the substance which remains, according to Proust, consists of three parts of protoxide of antimony and one of sulphuret of antimony. Buchner considers it as a stibiothionate of antimony with excess of base.

With regard to the mode of preparation, Bergman observes, that by the common process of throwing the mixture into an ignited uncovered crucible, there is sometimes a loss of nearly one half; and therefore advises the mixture to be put into a cold crucible, which is to be covered, and heated till the matter melts; but as soon as the applied heat reaches a certain degree, the whole mass takes fire, and deflagrates violently. Indeed, the application of heat to the crucible is perfectly unnecessary, and the Berlin Pharmacopœia directs the mixture to be put into a clean iron pot, and kindled by touching it with a bit of live coal, or, what is better, the end of a tobacco pipe, or iron rod, heated to redness. In this way the fusion and separation of the scoriæ is no less complete than when the mixture is gradually projected into a heated crucible, and, unless for very great quantities, it is most convenient.

The crocus kept in the shops is almost universally prepared with less nitre than is here ordered. The consequence is, that too much sulphur remains not acidified, the antimony is scarcely oxidized, and the preparation is unfit for the uses to which it ought to be applied. When nitre has been thus economized, the crocus has a steel grey, instead of a liver brown colour.

Pharm. use.—Crocus of antimony is employed by the Edinburgh College for the preparation of tartar-emetic.

Med. use.—The crocus of antimony is a very uncertain preparation, often operating with very great violence. Its internal use is, therefore, almost proscribed, or at least confined to veterinary practice.

ANTIMONIUM TARTARIZATUM. *Lond.*
Tartarized Antimony.

Take of
- Glass of antimony, in very subtile powder,
- Supertartrate of potass in powder, each one pound;
- Distilled water, one gallon.

Mix the glass of antimony and supertartrate intimately together, and throw them gradually into the boiling water, stirring it constantly with a rod; boil for a quarter of an hour, and set it aside. Filter the liquor when cold, and when filtered, boil it down to form crystals.

TARTARUM ANTIMONIATUM *sive* EMETICUM. *Dub.*
Antimoniated or *Emetic Tartar.*

Take of
- Nitromuriatic oxide of antimony, two ounces;
- Crystals of tartar, in very fine powder, two ounces and a half;
- Distilled water, eighteen ounces by measure.

Boil the water in a glass vessel, then gradually throw into it the oxide and tartar, previously mixed, and boil for half an hour; then filter the liquor through paper, and crystallize by slow cooling.

THE tartaric acid is capable of combining, in many examples, with two bases at the same time, forming with them triple crystallizable salts. In the present instance, it is combined with oxide of antimony and potass; and as the potass is essential to its constitution, and the real tartrate of antimony is a different salt, its name, on chemical principles, should certainly have been Tartrate of antimony and potass, but the old name of Tartar-emetic is without ambiguity.

In the preparation of this salt, the different combinations of protoxide of antimony, the crocus, precipitated oxide, submuriate and glass, have all been occasionally employed. Any of them will afford a very pure salt.

The Edinburgh College uses the crocus. To this the principal objection is, that it is rarely found in the shops in a state fit for this purpose. Even when properly prepared, it is with difficulty acted upon by the supertartrate of potass, unless it be levigated and elutriated. Mr Phillips found, that 100 parts of cream of tartar dissolved only 6 parts out of 100 of very finely powdered crocus, 16 when levigated, but 75 when it was elutriated; and in the last case, the liquor assumed a deep green colour, which, though proceeding from the presence of iron, is a test that a sufficient proportion of the metallic oxide is dissolved, as it does not occur until the tartar has taken up three-fourths of its weight of the crocus. But, besides the expense of levigating and elutriating the crocus, it is liable to be mixed with carbonate of lime, derived probably from the stones employed in the levigation; and the crystals of tartarized antimony procured in this way are consequently contaminated even with a larger proportion of tartrate of lime than is furnished by the tartar.

The glass is more easily soluble than the crocus, as, when finely powdered, in Mr Phillips' experiments, 78 parts were dissolved, and gave the solution a dark green colour. It is the oxide now used by the London College, as the objections formerly arising from its expense have been much lessened. When the glass or crocus is used, Mr Phillips recommends, that after being powdered or levigated, they should be boiled in dilute sulphuric acid, to remove any carbonate of lime, and that a small quantity of sulphuric acid should be added to decompose the tartrate of lime.

To the oxide of antimony, as prescribed by the London College 1809, Mr Phillips objected its great expense, its quantity being too small in proportion to the tartar; and that the crystals of tartar-emetic formed with it, as well as with the crocus or glass, are contaminated with the tartrate of lime usually contained in the tartar.

To the use of the submuriate, as directed by the Dublin College, this last objection does not apply, because the muriatic acid retains the tartrate of lime in solution when the tartrate of antimony crystallizes. Having criticised the processes of all the colleges, Mr Phillips proposed to substitute one of his own. The qualities requisite in an eligible method of preparing tartar-emetic, he says, are, the certainty of obtaining protoxide of antimony unmixed with peroxide or sulphuretted oxide, yet not absolutely pure, but mixed with a substance capable of preventing the crystallization of the tartrate of lime; moderate expense, and the possibility of using iron vessels, both in preparing the oxide of antimony and the tartarized antimony. These requisites, Mr Phillips thinks, he has found in employing the sulphate of antimony prepared by boiling powdered metallic antimony in twice its weight of sulphuric acid to dryness in an iron vessel over a common fire, and stirring it with an iron spatula. The greyish coloured product was thrown into water, and washed, till the uncombined sulphuric acid was removed. 100 parts of the subsulphate thus procured were boiled in a solution of an equal weight of tartar; about 76 parts of the subsulphate were readily dissolved, and the solution, when filtered, afforded at the first crystallization rather more than 90 parts of crystals of tartarized antimony, perfectly white and unmixed with any extraneous salt. The solution, by further evaporation, furnished an additional quantity of crystals of emetic tartar, slightly incrusted with sulphate of lime, from which, however, they were completely purified by solution, and repeating the crystallization. A considerable quantity of sulphate of lime was also deposited and separated during the evaporation. This process Mr Phillips asserts to be neither tedious, difficult, uncertain, nor unsafe.

But whatever form of protoxide of antimony may be preferred, the quantity of water employed must be sufficient to dissolve the tartar-emetic formed. The time during which the ebullition is to be continued is stated differently by different pharmaceutists. No harm can arise from continuing it longer than is absolutely necessary; but it is certainly a waste of time and fuel to protract it for hours.

Another circumstance which renders tartar-emetic variable in its effects, is, the mode of crystallization. Some evaporate it to dryness; others to a pellicle, and set it aside to crystallize; and others again crystallize by slow evaporation. On account of the silica which is combined with the oxide of antimony in the crocus and glass, and which, being held in solution by the potass, impedes the crystallization, and varies the nature of the product, Vauquelin recommends that the solution be first evaporated to dryness, and that the saline mass obtained should be redissolved in boiling water, and then crystallized; for, towards the end of the first evaporation, the silica separates, and becomes totally insoluble. In this way, he says, that we obtain both a purer salt, and in larger quantity. If we employ an excess of supertartrate of potass, part of it will remain undecomposed, and will crystallize before, or along with the tartar-emetic. This source of impurity is easily avoided, by using an excess of the antimonial oxide, which, remaining undissolved, occasions no error, and prevents the necessity of throwing away the crystals which form on the filtering paper, if the solution be saturated.

The primitive form of the crystals of tartrate of antimony and potass seems to be the regular tetrahedron, but it assumes a variety of secondary forms. It has a styptic metallic taste. It is soluble in three times its weight of water at 212°, and in fifteen at 60°. As this statement of its solubility is very different from that of most writers, from Bergman to Fourcroy, who say that it requires 80 parts of water at 60°, and somewhat less than 40 of boiling water, it is necessary to mention, that it was ascertained by careful experiment, with very fine crystals of tartar-emetic, more than half an inch in length, and perfectly free from the admixture of any foreign salt. The crystals, by exposure to the air, become white and opaque, but do not readily fall to powder. The solution of tartar-emetic slightly reddens tincture of turnsole. It is decomposed by acids, alkalies, alkaline carbonates, sulphuretted hydrogen and its compounds, vegetable juices, decoctions, and infusions, and many of the metals.

The most accurate analysis of tartar-emetic is that by Dr Thomson, who found it to consist of two primes of tartaric acid 16.5; three of protoxide of antimony 19.5; one of potash 6; and two of water 2.25 = 44.25. And Mr Phillips found, that 100 parts of supertartrate of potass dissolve 70 of protoxide of antimony.

From what has been said, it will appear, that without any fraudulent intention, tartar-emetic is often imperfect. Its goodness should be ascertained by taking a few crystals promiscuously from every fresh parcel, washing them in water, and then introducing each crystal separately into dilute solutions of sulphuret of potass, when, if the salt be perfect, a considerable orange precipitate will occur in each. But tartar-emetic is often sold in the form of powder, to conceal its imperfections; this ought to be examined in the same way as the crystals; or rather it should be rejected.

Pharm. use.—It is dissolved in wine or in dilute alcohol; and in the former edition of the London Pharmacopœia the protoxide was precipitated from it by ammonia.

Medical use.—In doses of from one to three grains it operates as an emetic, and sometimes as a cathartic. In smaller doses, it excites nausea, and proves a powerful diaphoretic and expectorant. As an emetic, it is chiefly given in the beginning of fevers and febrile diseases, in chincough, and, in general, whenever we wish to evacuate the stomach quickly. When great debility is present, and in the advanced stages of typhoid fever, its use is improper, and even sometimes fatal. As a diaphoretic, it is given in small doses, of from an eighth to a quarter of a grain; and as an expectorant, in doses still smaller.

Of late the use of tartar-emetic has been extended to almost all inflammatory diseases, chiefly by the Italians and French, as a contro-stimulant, or to depress the system. It is given in two ways; either in large doses, dissolved in the smallest quantity of water, upon an empty stomach, and all drink withheld; or in repeated doses of a weak solution. In the former way, I have never ventured upon the enormous doses exhibited by Rasori and Tommasini; but I have given to the extent of five grains at once without producing vomiting: and in the latter way, or in nauseating doses, I have often administered it with the best effect, when I did not think venesection could be borne.

The only proper form for exhibiting it is in solution; and as the intensity of its action on the body is liable to variation, from differences in its own strength, and in the constitution of the patient, it should almost always be given in divided doses, at short intervals, if we wish to excite vomiting; and at longer intervals, if we wish it to act only on the skin or lungs.

Poisoning sometimes happens from excessive doses of tartar-emetic, and in its effects it coincides with arsenic, but it is easily decomposed. Since Vauquelin's discovery, that it is decomposed by cinchona, the decoction of that bark has been generally recommended; but in the case of Dr Duffin, who, by accident, swallowed a poisonous dose, I administered a solution of *hepar sulphuris* with perfect success.

VINUM TARTRATIS ANTIMONII. *Ed.*
Wine of Tartrate of Antimony.

Take of
- Tartrate of antimony, twenty-four grains;
- Sherry wine, one pound.

Mix them, so that the tartrate of antimony may be dissolved.

VINUM ANTIMONII TARTARIZATI. *Lond.*
Wine of Tartarized Antimony.

Take of
- Tartarized antimony, one scruple;
- Boiling distilled water, eight fluidounces;
- Rectified spirit, two fluidounces.

Dissolve the tartarized antimony in the boiling distilled water, then add the spirit to the solution filtered.

FORMERLY antimonial wine was a fortuitous preparation, by steeping glass of antimony in white wine; a portion of the glass of antimony was dissolved by the supertartrate of potass contained in the wine; and as the quantity of this is variable, so also the quantity of oxide of antimony dissolved varied; and, therefore, the preparation is with propriety entirely rejected, since its strength could never be known.

Both the officinal preparations contain two grains to an ounce of fluid; but the Edinburgh College use wine, and the London, having entirely rejected the pharmaceutical use of wine, on account of its tendency to decomposition, employ water, with a small proportion of spirits; but it certainly seems inconsistent that they should have resumed the appellation of *Vinum*, when they discard the wine from a preparation, which they called *Liquor*, when it contained wine.

It is convenient to have an officinal solution of a substance so frequently exhibited; and this, made with an alcoholic liquor, is not so liable to decomposition as a watery solution.

CHAP. VI.—SILVER.

NITRAS ARGENTI. *Ed.*
Nitrate of Silver.

Take of
- Purest silver, flatted into plates, and cut in pieces, one part;
- Diluted nitrous acid, two parts;
- Distilled water, one part.

Dissolve the silver in the acid and water previously mixed, in a matrass with a gentle heat, and evaporate the solution to dryness. Then put the mass into a large crucible, and place it on the fire, which should at first be gentle, and afterwards increased by degrees till the mass flows like oil; then pour it into iron pipes, previously heated and anointed with tallow. Lastly, keep it in a glass vessel very well corked.

Dub.

Take of
- Silver, flatted into plates, and cut in pieces,
- Nitrous acid, of each one ounce by weight;
- Distilled water, two ounces by measure.

Put the silver in a glass phial, placed in a sand-bath, and pour on the acid, previously diluted with the water; then, gradually increasing the heat, dissolve the metal, and evaporate the liquor to dryness. Liquefy the mass which remains, in a crucible over a slow fire. Pour it into proper moulds, and keep it in a glass vessel well corked.

Lond.

Take of
- Silver, one ounce;
- Nitric acid, one fluidounce;
- Distilled water, two fluidounces.

Mix the nitric acid with the water, and dissolve the silver in the mixture in a sand-bath. Then gradually increase the heat until the nitrate of silver become dry. Melt this in a crucible with a gentle fire, until the ebullition ceases from the expulsion of the water; then immediately pour it out into proper moulds.

In this process the silver is oxidized by the decomposition of a portion of the acid, and the oxide is dissolved in the remainder, while nitric oxide gas is evolved, forming red fumes of nitrous acid, on coming in contact with the air. The crystals are anhydrous, and consist, according to Dr Thomson, of one prime of oxide of silver 14.75, and one of nitric acid 6.75 = 21.5.

The acid employed must be very pure. If it contain, as the acid of commerce always does, sulphuric or muriatic acid, these react upon the nitrate as soon as it is formed, and a white precipitate, consisting of sulphate or muriate of silver, falls to the bottom.

The method which the refiners employ for examining the purity of their aquafortis (the name they give to dilute nitrous acid,) and purifying it, if necessary, is to let fall into it a few drops of a solution of nitrate of silver already made; if the liquor remain clear, it is fit for use: otherwise, they add a small quantity more of the solution, which immediately turns the whole of a milky white colour; the mixture being then suffered to rest for some time, deposites a white sediment, from which it is cautiously decanted, examined again, and, if necessary, farther purified by a fresh addition of this solution.

It is necessary to employ very pure water in this process; for the muriates and earthy salts which common water generally contains, precipitate part of the silver in the state of a muriate or oxide. If distilled water be not used, the water should be added to the acid before it be tried, and purified by the nitrate of silver.

The solution will go on the more speedily, if the silver, flatted into thin plates, be rolled loosely up, so that the several surfaces do not touch each other. By this management, a greater extent of the surface is exposed to the action of the menstruum, than when the plates are cut in pieces and laid above each other. If the silver be alloyed with copper, the solution will have a permanent greenish-blue colour, and acquire a bright blue on the addition of ammonia. If it contain gold, the gold is not dissolved, but is found at the bottom of the solution, in the form of a black or deep purple powder.

The crucible ought to be of porcelain; as, with the common crucibles, the loss arising from the nitrate of silver sinking into their substance is too great. It ought also to be large enough to hold five or six times the quantity of the dry matter; for it bubbles and swells up greatly, so as to be apt to run over. During the evaporation also, little drops are now and then spirted up, whose causticity is increased by their heat, against which the operator ought therefore to be on his guard. The fire must be kept moderate till this ebullition ceases, and till the matter becomes consistent in the heat that made it boil before: the fire is then to be quickly increased, till the matter flows thin at the bottom like oil, when it is to be immediately poured into the mould; for if the heat be continued after this, the nitrate of silver begins to be decomposed, and the silver is reduced.

The mould should be of iron, or one may be formed in a mass of tempered tobacco pipe clay, not too moist, by making, with a smooth stick, previously greased, a sufficient number of holes. Each piece is to be wiped clean from the grease, and wrapt up in soft dry paper, not only to keep the air from acting upon them, but likewise to prevent their corroding or discolouring the fingers in handling.

Nitrate of silver is crystallizable. Its crystals are brilliant plates, having a variable number of sides. Their taste is austere, and intensely bitter. They are very soluble in water, but permanent in the air and not deliquescent. They are decomposed by heat, light, phosphorus, charcoal, many metals, all the alkalies and earths, sulphuric, muriatic, phosphoric, and fluoric acids, and by the salts they form. When deprived of water, and melted according to the directions of the colleges, nitrate of silver forms a pale grey coloured mass, hard, sonorous, and consisting of radii, diverging from the centre. It is sometimes dark coloured, or almost black, from the separation of a portion of oxide from excessive heat, or from containing copper. When free from copper, which is seldom the case, it is not deliquescent. It may, however, be prepared perfectly pure, even from a solution containing copper, by evaporating and crystallizing it as long as it furnishes firm tabular crystals. These are then to be washed with a little distilled water, and melted with a gentle heat. The nitrate of copper remains in the mother water, from which the silver it contains may be precipitated by muriatic acid.

Medical use.—A strong solution of nitrate of silver corrodes and decomposes animal substances: in a more diluted state, it stains them of an indelible black; and, for this purpose, it is now used as an indelible marking ink. The fused nitrate of silver is the strongest and most manageable caustic we possess, and is employed to remove fungous excrescences, callous edges, warts, strictures in the urethra, and the like. It is also used to destroy the venereal poison in chancres, before it has acted on the system. A weak solution of it may be applied, as a stimulus, to indolent ulcers, or injected into fistulous sores, and is almost specific in ringworm. A saturated solution has even been injected into the urethra in gonorrhœa, but I cannot approve of the practice, especially since, on a comparative trial, it was found not to remove the disease sooner than less suspicious remedies.

Notwithstanding its causticity, it has been given internally. Boërhaave, Boyle, and others, commend it highly in hydropic cases. The former assures us, that, made into pills with crumb of bread and a little sugar, and taken on an empty stomach (some warm water, sweetened with honey, being drank immediately after,) it purges gently, without griping, and brings away a large quantity of water, almost without the patient's perceiving it: that it kills worms, and cures inveterate ulcerous disorders. He nevertheless cautions against using it too frequently, or in too large a dose; and observes, that it always proves corrosive and weakening to the stomach.

It has been more recently employed with very great freedom, and with success, in epilepsy, chorea, and other spasmodic diseases. When it proves successful, the fits gradually become less severe, and occur at longer intervals; but sometimes, after giving hopes of a cure, they return as severely as before, and the medicine has lost its power over them. Also, when long continued, the nitrate of silver has the unpleasant effect of rendering the exposed parts of the skin of a dark colour, almost like that of a mulatto, apparently in consequence of the reduction of the silver by the action of light. This dark colour remains for life, or at least for a very long time, and resists long all remedies, although it is said that a steady course of cream of tartar at last removes it. On account of its very great activity, each pill should not contain above one-eighth or one-fourth of a grain.

CHAP. VII.—ARSENIC.

ARSENICUM ALBUM SUBLIMATUM. *Lond.*
Sublimed White Arsenic.

Reduce white arsenic to powder; then put it into a crucible; apply heat, and sublime it into another crucible inverted over the former.

THE white oxide of arsenic of commerce is obtained as an insignificant product in roasting cobalt ores, and is therefore often impure. By sublimation, however, it is easily separated from foreign matters, but the operator must be very careful to avoid the fumes which arise during the process.

LIQUOR ARSENICALIS. *Lond.*
Arsenical Solution.

Take of

Sublimed white arsenic, in very subtile powder,
Subcarbonate of potass from tartar, of each sixty-four grains;
Compound spirit of lavender, four fluidrachms;
Distilled water, a pint.

Boil the white arsenic and subcarbonate of potass with the water in a glass vessel, until the arsenic be entirely dissolved. Add to the solution, when cold, the compound spirit of lavender.

Lastly, add as much more distilled water as will make the whole amount exactly to a pint.

SOLUTIO ARSENICALIS. *Ed.*
Solution of Arsenic.

Take of

Oxide of arsenic in very fine powder,
Pure subcarbonate of potass, of each sixty-four grains;
Distilled water, fourteen ounces.

Boil together in a glass vessel, with a gentle fire, until the whole oxide be dissolved. To the liquor, when cold, add,

Compound spirit of lavender, half an ounce;
Distilled water, as much as will make the whole solution amount to sixteen ounces.

This preparation is a solution of arsenite of potass, and corresponds with Dr Fowler's tasteless ague-drop. The spirit of lavender is added merely to prevent its being mistaken for water, an accident which might happen from its want of colour and taste. It may also preserve it from decomposition, as stated by Mr Hume. Now that arsenic is so much used, it is useful to have an officinal solution of an uniform strength. Dr Powell has justly observed, that "where the dose is small, and the effects so powerful, the most minute attention to its proportion and preparation become necessary." A drachm of the solution contains one-half of a grain, and it will seldom be necessary to give above ten minims for a dose.

ARSENIAS KALI. *Dub.*
Arseniate of Kali.

Take of
White oxyde of arsenic,
Nitrate of kali, of each one ounce.

Reduce them separately to powder; and after mixing them, introduce them into a glass retort, placed in a sand-bath, which is to be gradually heated, until the bottom of the retort become obscurely red. It is expedient to transmit the vapours issuing from the retort, by means of a proper apparatus, through distilled water, that the nitrous acid extricated by the heat may be condensed. Dissolve the residuum in four pounds of boiling distilled water; and, after due evaporation, set it aside to crystallize.

The Dublin preparation is crystallized arseniate of potass. On the application of the heat, the nitric acid of the nitre is decomposed, the oxygen combines with the oxide of arsenic, and converts it into arsenic acid, which unites with the potass, and nitrous gas escapes, forming red fumes of nitrous acid. I should not think the latter of sufficient importance to be condensed, as directed by the Dublin College; especially when we consider the possibility of its being contaminated by arsenic, unless, perhaps, according to the latter supposition, it be intended to preserve the operator from the noxious fumes.

Med. use.—This preparation should be very uniform, but it has never come into general use.

CHAP. VIII.—BISMUTH.

BISMUTHI SUBNITRAS. *Lond.*
Subnitrate of Bismuth.

Take of
Bismuth, one ounce;
Nitric acid, one fluidounce and a half;
Distilled water, three pints.

Mix six fluidrachms of the distilled water with the nitric acid, and dissolve the bismuth in them. Add the rest of the water to the filtered liquor, and set it at rest till the powder subside. Then decant the supernatant liquor, and wash the subnitrate of bismuth with distilled water, and dry it, wrapped up in bibulous paper, with a gentle heat.

THE preparation of the Magistery of bismuth as a cosmetic, was a profitable secret in the family of Nicholas Lemery. In the beginning of the 18th century it became public; and about 1800 Bucholz and Rose explained its real nature, having till that time been considered an oxide.

Bismuth dissolves readily in nitric acid of sp. gr. 1.25, with the evolution of nitric oxide gas. The solution is colourless, and by evaporation yields colourless crystals obliquely rhomboid, consisting of oxide of bismuth 10, nitric acid 6.75, and water $3.375 = 20.125$. The solution is decomposed by the addition of more than a certain proportion of water. It becomes milky, and lets fall a fine crystalline powder of a brilliant white colour. That this is a subnitrate is proved by its emitting nitrous fumes when acted upon by sulphuric acid. In solution there remains a binitrate of bismuth, which may be obtained in crystals.

To succeed in this preparation the metal must be added gradually, otherwise the action is too violent; the acid must be fully saturated, which is known when, on the addition of the last bit of bismuth, some white powder remains undissolved. It should be diluted with a quantity of water equal in volume to the solution, which does not decompose it, and filtered, and gradually added with constant stirring to a quantity of water equal to 30 times the weight of the metal dissolved. The precipitate must be quickly separated, washed twice with half the quantity of distilled water, and dried as speedily as possible, otherwise it concretes into a crystalline mass, and loses the lightness and smoothness for which it is esteemed.

The subnitrate of bismuth is commonly in the state of a tasteless and inodorous, white, minute, crystalline, spongy powder, but may be procured in more evident prismatic crystals. When first prepared and still moist, it is soluble in a large quantity of water; after drying almost insoluble. It loses its acid and is vitrified yellow by heat, and blackened by light and sulphuretted hydrogen, especially if moist. It is readily soluble in concentrated acids, and sparingly soluble in solution of potass or soda, and more abundantly in ammonia.

Medical use.—The medical virtues of this preparation are uncertain. It has been considered as antispasmodic. Odier of Geneva gave it in gastrodynia in doses from 1—12 grains, but recommended smaller doses at first, as with some it produced nausea, disposition to vomit, anxiety and vertigo. It was made known in this country by the late Dr Marcet, and the most accurate reports of its virtue have been given by Dr Bardesley. It is blackened in passing through the bowels. I consider it on a level with the oxide of zinc.

CHAP. IX.—COPPER.

ÆRUGO PRÆPARATA. *Dub.*
Prepared Verdegris.

Let the verdegris be ground to powder, and the minute particles be separated in the manner directed for the preparation of chalk.

THE intention of this process is merely to obtain the verdegris in the state of the most minute mechanical division.

SOLUTIO SULPHATIS CUPRI COMPOSITA. *Ed.*
Compound Solution of Sulphate of Copper.

Take of
Sulphate of copper,
Alum, of each three ounces;
Water, two pounds;

Sulphuric acid, an ounce and a half.

Boil the sulphates in the water, to dissolve them, and then add the acid to the liquor filtered through paper.

In this preparation, the substances dissolved in the water exert no chemical action on each other, and the composition was probably contrived, from the false idea, that the sum of the powers of substances having similar virtues was increased by mixing them with each other.

Medical use.—It is chiefly used as a styptic for stopping bleedings at the nose and from other passages; and, for this purpose, cloths, or dossils, steeped in the liquor, are to be applied to the part.

AMMONIARETUM CUPRI. *Ed.*

Ammoniaret of Copper.

Take of

Pure sulphate of copper, two parts;
Subcarbonate of ammonia, three parts.

Rub them carefully together in a glass mortar, until, after the effervescence has entirely ceased, they unite into a violet-coloured mass, which must be wrapped up in blotting paper, and first dried on a chalk stone, and afterwards by a gentle heat. The product must be kept in a glass phial, well corked.

CUPRUM AMMONIATUM. *Dub.*

Ammoniated Copper.

Take of

Sulphate of copper, one ounce;
Carbonate of ammonia, an ounce and a half.

Triturate them in an earthen-ware mortar, until, after the effervescence has entirely ceased, they unite into a mass, which is to be wrapped up in bibulous paper, dried, and kept in a phial, closed with a glass-stopper.

Lond.

Take of

Sulphate of copper, half an ounce;
Subcarbonate of ammonia, six drachms.

Rub them together in a glass mortar, until the effervescence cease; then dry the ammoniated copper, wrapped up in blotting paper, with a gentle heat.

It may seem strange, that particular directions should be given concerning the manner of drying a mixture, which is prepared by rubbing two dry substances together. But such a phenomenon is by no means uncommon, and arises from the quantity of water of crystallization contained in the ingredients being greater than what is required in the new compound formed: As soon, therefore, as the ingredients begin to act upon each other, a quantity of water is set at liberty, which renders the mass moist.

The nature of this compound, and consequently the name which should be given it, are not yet sufficiently ascertained. Prepared according to the directions of the colleges, it evidently contains oxide of copper, ammonia, and sulphuric acid. If these substances be chemically combined, which is probable, as it may be obtained in fine prismatic crystals, it should be denominated the Subsulphate of copper and ammonia. By exposure to the air during its exsiccation, and by keeping, it is apt to lose its transparent blue colour entirely, and become opaque green. It should therefore be prepared in small quantities at a time.

Medical use.—Ammoniaret of copper has been strongly recommended in epilepsy; but, from its good effects sometimes ceasing after it has been used for some time, a want of success, in some cases, and the disagreeable consequences with which its use is sometimes attended, it has not lately been much prescribed. In my practice, however, its success has often exceeded my expectations. It is exhibited by beginning with doses of half a grain twice a-day, and increasing them gradually to as much as the stomach will bear. Dr Cullen sometimes increased the dose to five grains.

AQUA CUPRI AMMONIATI. *Dub.*
Water of Ammoniated Copper.

Take of
  Lime-water, eight ounces, by measure;
  Muriate of ammonia, two scruples;
  Verdegris prepared, four grains.
Mix and digest them for twenty-four hours, then pour off the pure liquor.

LIQUOR CUPRI AMMONIATI. *Lond.*
Solution of Ammoniated Copper.

Take of
  Ammoniated copper, one drachm;
  Distilled water, one pint.
Dissolve the ammoniated copper in the water, and filter through paper.

In the Dublin preparation, the lime-water decomposes the muriate of ammonia, and forms muriate of lime; while the ammonia disengaged immediately reacts upon the oxide of copper contained in the verdegris, and renders it soluble. The mode of preparing this solution, now adopted by the London College, has the great merit of simplicity; but, unfortunately, from the large quantity of water employed, one half of the ammoniaret of copper is decomposed, and the oxide is precipitated. Mr Phillips found, that one-fourth of the water used, or even less, was sufficient for the solution of the ammoniaret.

Medical use.—The solution is applied externally for cleaning foul ulcers, and disposing them to heal. It has been recommended also for taking off specks and films from the eyes; but, when used with this intention, it ought to be diluted with some pure water, as in the degree of strength in which it is here ordered, it irritates and inflames the eyes considerably. It is the readiest, and, perhaps, the most delicate, test of arsenic, by which its blue colour is converted into Scheele's green.

CHAP. X.—IRON.

LIMATURA FERRI PURIFICATA. *Ed.*
Purified Filings of Iron.

Place a sieve over the filings, and apply a magnet, so that the filings may be attracted upwards through the sieve.

This process does not fulfil the purpose for which it is intended; for the adhesion of a very small particle of iron renders brass and other metals attractable by the magnet. The filings of iron got from the shops of different artificers, which are always mixed with solder, and other metals, cannot be purified in this way, so as to render them fit for internal use; and, indeed, the only way they can be obtained sufficiently pure is by filing a piece of pure iron with a clean file.

OXIDUM FERRI NIGRUM PURIFICATUM. *Ed.*
Purified Black Oxide of Iron.

Let the scales of the oxide of iron, which are to be found at the foot of the blacksmith's anvil, be purified by the application of a magnet, which will attract only the smaller and purer scales.

OXYDUM FERRI NIGRUM. *Dub.*
Black Oxyde of Iron.

Separate the scales of oxyde of iron, gathered at a blacksmith's forge, from impurities, by applying the magnet. Then reduce them to powder, of which the finest particles are to be collected in the manner directed for the preparation of chalk.

HERE the application of the magnet is useful, because these scales contain no foreign metal, but are mixed with earthy and other impurities, which could be separated in no other way. The Prussian Dispensatory direct this oxide to be prepared by moistening the carbonate of iron with olive oil, distilling it to dryness in a retort, and heating it almost to redness. The iron, in this process, is reduced from the state of peroxide to that of protoxide.

SUBCARBONAS FERRI PRÆPARATUS. *Ed.*
Prepared Subcarbonate of Iron.

Moisten purified filings of iron frequently with water, that they may be converted into rust, which is to be ground into an impalpable powder.

Dub.

Take of
Iron-wire, any quantity.

Cut it into pieces, which are to be moistened frequently with water, and exposed to the air until they be corroded into rust. Then triturate them in an iron mortar, and by pouring water upon them, wash over the finest part of the powder, which is to be dried.

IRON is one of the most easily oxidized of the metals. By exposure at the same time to air and moisture, it is very quickly oxidized, while it also absorbs carbonic acid, and is converted into a reddish-brown pulverulent substance, well known by the name of Rust of iron. For medical use it is prepared by trituration and elutriation.

CARBONAS FERRI PRÆCIPITATUS. *Ed.*
CARBONAS FERRI. *Dub.*
Precipitated Carbonate of Iron.

Take of
Sulphate of iron, four ounces;
Subcarbonate of soda, five ounces;
Water, ten pints.

Dissolve the sulphate in the water, and add the carbonate of soda previously dissolved in a sufficient quantity of water, and mix them thoroughly.

Wash the precipitated carbonate of iron with warm water, and afterwards dry it.

FERRI SUBCARBONAS. *Lond.*
Subcarbonate of Iron.

Take of
Sulphate of iron, eight ounces;
Subcarbonate of soda, six ounces;
Boiling water, a gallon.

Dissolve the sulphate of iron and subcarbonate of soda separately, each in four pints of the water; mix the solutions, and set aside until the precipitate subside; then, having poured off the supernatant liquor, wash the subcarbonate of iron with warm water, and dry it wrapped up in bibulous paper, with a gentle heat.

ON mixing the solutions of these salts together, there is an immediate mutual decomposition. Sulphate of soda is formed, which remains in solution, and carbonate of iron, which is precipitated of a green colour. The precipitate, when first formed, is the carbonate of black oxide of iron, or contains the iron in the state of protoxide, the state in which it exists in the green sulphate of iron; but in the process of drying, it absorbs more oxygen, becomes of a red colour, and part of it is converted into red oxide of iron. As the precipitate is extremely light and bulky, it is not easily separated by allowing it to subside, and pouring off the clear liquor; filtration should therefore be employed. The carbonate of soda is used on account of the greater solubility of sulphate of soda than of sulphate of potass, which renders the subsequent ablution of the salt more easy.

The Edinburgh College use five ounces of the alkaline salt, and the London only three, to decompose four of the chalybeate. Mr Phillips says scarcely 4.25 are sufficient.

Mr Phillips found very great differences in the results from very slight differences in conducting the process; and he concludes, that it is more economical to use hot water in every part of the process, and to use potass instead of soda in the preparation.

Subcarbonate of iron, when well prepared, is a powder of a reddish brown colour, readily soluble in acids, and, according to Mr Phillips, yielding about 15 *per cent.* carbonic acid. When imperfectly prepared it contains much less carbonic acid, and is not so soluble, and its colour is deeper red. Mr Phillips conjectures, with great probability, that it will be more active as a medicine in proportion to the quantity of carbonic acid it contains. Attention to its mode of preparation is therefore of great importance.

Pharm. use.—It is employed in preparing the ammoniated iron, the tincture of the muriate and the tartrate.

Medical use.—The carbonate of iron is an excellent and safe chalybeate. It may be given in doses of from five grains to sixty; but all chalybeates answer better in small doses, frequently repeated, than in large doses.

The carbonate and some other preparations of iron were strongly recommended some years ago, both externally and internally for the cure of cancer, but the cases in which they succeeded were probably spurious, as they have often failed in true cancer. In the treatment of neuralgia, its exhibition, as first proposed by Mr B. Hutchinson, has been more successful, and has now became an established practice. He gives half a drachm to four scruples three times a-day. Besides the remission of the paroxysm, no very obvious effects are produced.

SULPHAS FERRI. *Ed.*
Sulphate of Iron.

Take of
- Purified filings of iron, six ounces;
- Sulphuric acid, eight ounces;
- Water, two pounds and a half.

Mix them, and after the effervescence ceases, digest the mixture for some time upon warm sand; then strain the decanted liquor through paper, and after due evaporation set it aside to crystallize.

Dub.

Take of
- Iron-wire, two ounces;
- Sulphuric acid, three ounces and a half, by weight;
- Water, one pint.

Mix the acid by degrees with the water, in a glass vessel, and gradually add the iron-wire, cut into pieces: digest the mixture till the metal be dissolved, and strain the liquor through paper. Lastly, set aside the liquor, after due evaporation, to crystallize by slow refrigeration.

Lond.

Take of
  Iron,
  Sulphuric acid, each eight ounces by weight;
  Water, four pints.

Mix the sulphuric acid with the water in a glass vessel, and add the iron; when the effervescence has ceased, strain the solution through paper, and after due evaporation set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

SULPHATE of iron cannot be procured perfectly pure, except by the direct union of sulphuric acid and iron.

Iron scarcely acts upon concentrated sulphuric acid, unless assisted by heat. It then becomes oxidized, by abstracting oxygen from a portion of the acid, and converting it into sulphureous acid gas, and combines with the remainder of the acid. But it acts with great rapidity on diluted sulphuric acid; in which case it is not oxidized at the expense of the acid itself, but by decomposing the water, and therefore the hydrogen of the water is separated in the form of gas. The action of the acid and iron upon each other often ceases before the acid is nearly saturated, and may be renewed by the addition of a little water. The reason is, that all the water which was not decomposed is employed to dissolve the sulphate of iron formed.

The properties and uses of sulphate of iron have been already mentioned.

SULPHAS FERRI EXSICCATUS. *Ed.*
Dried Sulphate of Iron.

Take of
  Sulphate of iron, any quantity.

Expose it to the action of a moderate heat in an unglazed earthen vessel, until it become white and perfectly dry.

SULPHAS FERRI EXSICCATUM. *Dub.*
Dried Sulphate of Iron.

Take of
  Sulphate of iron, any quantity.

xpose it in an unglazed earthen vessel, to a high temperature (200° to 212° Fahr.) until it become white.

THE heat applied here must not be so great as to decomse the sulphate of iron, but only to deprive it of its water crystallization, about 20 *per cent.*

OXIDUM FERRI RUBRUM. *Ed.*
Red Oxide of Iron.

xpose dried sulphate of iron gradually to an intense heat, until it is converted into a very red substance.

Dub.

ast with an intense heat dried sulphate of iron until it become very red. Then wash it, until, according to the test of litmus, the water decanted from it be free of acid; lastly, dry it on blotting paper.

BY the violent heat applied in this preparation, the sulphate iron is completely decomposed, and copious white fumes expelled. The iron is converted into the red oxide; part the sulphuric acid is therefore reduced to the state of sulurous acid, and the rest of the acid is expelled in a very ncentrated state. This process was formerly employed in s country, and still is in Germany, for the preparation of phuric acid; which, however, from the presence of the sulurous acid, is possessed of some peculiar properties, such emitting fumes and crystallizing.

The residuum is composed of red oxide of iron, combined h a little red sulphate of iron, which renders it deliquesnt. To obtain the oxide perfectly pure, the residuum must refore be washed with water, and dried quickly, to prevent absorption of carbonic acid.

TINCTURA MURIATIS FERRI. *Ed.*
Tincture of Muriate of Iron.

ke of

Purified black oxide of iron in powder, three ounces;

Muriatic acid, about ten ounces, or as much as may be sufcient to dissolve the oxide.

gest by a gentle heat, and after the powder is dissolved, add of alcohol, as much as will make the whole quantity of liquor amount to two pounds and a half.

Dub.

Take of
  Carbonate of iron, half a pound;
  Muriatic acid, three pounds;
  Rectified spirit, three pints.

Pour the muriatic acid on the carbonate of iron in a glass ves sel; and shake the mixture occasionally during three day Then set it by, that the fæces, if any, may subside, an pour off the liquor; evaporate this to one pint slowly, an when cold, add the spirit.

Lond.

Take of
  Subcarbonate of iron, half a pound;
  Muriatic acid, a pint;
  Rectified spirit, three pints.

Pour the acid upon the subcarbonate in a glass vessel, an shake it occasionally for three days. Set it aside, that th dregs, if any, may subside. Pour off the clear liquo and add to it the spirit.

TINCTURA MURIATIS FERRI CUM OXYDO RUBRO. *Dub.*

Tincture of Muriate of Iron with the Red Oxide.

Take of
  Red oxide of iron, one ounce;
  Muriatic acid, four ounces, by measure;
  Rectified spirit of wine, the requisite quantity.

Digest the oxide with the acid for twenty-four hours, the boil for half an hour. Evaporate the filtered liquor to th thickness of syrup, and when cold, add rectified spirit c wine, with frequent agitation, until the tincture acquire th specific gravity of 1050.

MURIATIC acid is capable of combining either with th black or red oxide of iron, and forms with each, salts, ha ving distinctive properties. The permuriate of iron is no crystallizable; has a dark orange colour; is deliquescent forms a permanent brown-red solution, having a very astrin gent taste; and is soluble in alcohol. The protomuriate i crystallizable; has little colour; is very soluble in water forming a pale green solution; and is insoluble in alcohol But the aqueous solution of protomuriate attracts oxyge so strongly, that unless the access of the air be totally ex cluded, it is gradually converted into permuriate, and let fall a red precipitate. The solutions of iron, and of its prot xide, are accordingly found always to contain a greater or ss proportion of permuriate, and are therefore not uniform r constant in their properties.

In making this preparation, the colleges use iron in a dif- rent state; the Edinburgh, the black oxide; the Dublin, e red oxide; and the London, the carbonate. When the ack oxide is used, there will be little evolution of gas, and e solution will be chiefly protomuriate, which lets fall cry- als on the addition of the spirit. When the carbonate is ed, there is an effervescence of carbonic acid gas, and the lution is a mixture of protomuriate and permuriate, which not permanent. When the red oxide is used, there is a- in no effervescence, and the solution is now a permuriate, d permanent. Mr Phillips found that the proportions of e London College answered extremely well, and the tinc- re had a sp. gr. of 0.994, and contained 16.8 grains of per- xide of iron in half a fluidounce.

This tincture has a reddish brown colour, an etherial ell, and an extremely styptic taste. It is decomposed by l the alkalies, earths, and their carbonates, and strikes a ack or green colour with vegetable astringents.

Medical use.—It is an excellent chalybeate, and may be ven in doses of ten or twenty drops twice or thrice a-day, any proper vehicle. It is chiefly exhibited in scrofula as a nic, often in combination with muriate of lime, or of baryta; a styptic internally and externally in hæmorrhagies; and a specific in dysuria, given in doses of ten drops every ten inutes, until a sensible effect be produced.

MURIAS AMMONIÆ ET FERRI. *Dub.*

Muriate of Ammonia and Iron.

ake of
Red oxide of iron,
Muriate of ammonia, equal weights.
ix them thoroughly, and sublime with a sudden and sufficiently great degree of heat.

Ed.

ake of
Red oxide of iron, washed and again dried,
Muriate of ammonia, of each equal weights.
ix them thoroughly, and sublime with a quick fire. Triturate the sublimed matter, and preserve it in a very close phial.

Ferrum ammoniatum. *Lond.*
Ammoniated Iron.

Take of
  Subcarbonate of iron,
  Muriatic acid,
  Muriate of ammonia, of each a pound.

Pour the muriatic acid on the subcarbonate of iron, and se it aside until no more gas escape; filter through paper and evaporate to dryness; immediately mix the residuu intimately with the muriate of ammonia, and sublime wit an intense heat; and, lastly, reduce the sublimate to powder.

Although, at a low temperature, ammonia decompose the muriate of iron, at a high temperature iron and its oxide decompose muriate of ammonia. But as muriate of ammonia is itself a volatile salt, great part of it escapes undecomposed; so that the product is a mixture of muriate of ammonia with red muriate of iron. According to the formula o the Edinburgh and Dublin Colleges, the decomposition i effected by simple affinity. As soon as the oxide of iro acts on the muriate of ammonia, the ammonia which is separated comes over; then, as the heat increases, undecomposed muriate of ammonia is sublimed; which, as the proces advances, is mixed with an increasing proportion of muriat of iron. In the recent edition of the London Pharmacopœi a new process is introduced in imitation of the Prussia Dispensatory, in which permuriate of iron and muriate o ammonia are sublimed together. But the British College employ a much larger quantity of iron than is necessary According to the German pharmaceutists, if the iron be equa to one-sixteenth of the muriate of ammonia, it is sufficient.

Whatever process be employed, the heat must be applie as quickly as possible; and the sublimed product thoroughly mixed by trituration, and kept in well-stopt glass vessels It should have a deep orange-colour, and a smell resemblin saffron, and should deliquesce in the air.

Medical use.—This preparation is supposed to be highl aperient and attenuating, by virtue of the saline matter joined to the iron. It has been found of service in hysterical and hypochondriacal cases, and in distempers proceedin from a laxity and weakness of the solids, as the rickets From two or three grains to ten may be conveniently take in the form of a bolus.

TINCTURA FERRI AMMONIATI. *Lond.*
Tincture of Ammoniated Iron.

Take of
Ammoniated iron, four ounces;
Proof spirit, one pint.
Macerate and strain.

THIS is merely a spiritous solution of the preceding article, and agrees in its effects with the tincture of muriate of iron, but it is more diffusible.

TARTRAS POTASSÆ ET FERRI. *Ed.*
Tartrate of Potass and Iron.

Take of
Purified filings of iron, one part;
Supertartrate of potass, in powder, two parts;
Water, one part.

Triturate together and expose to the air in an earthen vessel for fifteen days, stirring the mixture daily with a spatula, and adding water from time to time to keep the mass always moist. Then boil the mass for a short time in four times its weight of distilled water, and pour off the solution from its dregs. Evaporate the solution in the heat of a water-bath to dryness, and grind the mass into powder, which is to be kept in very close phials.

FERRUM TARTARIZATUM. *Lond.*
Tartarized Iron.

Take of
Iron, one pound;
Supertartrate of potass, in powder, two pounds;
Distilled water, five pints, or as much as may be sufficient.

Triturate together the iron and supertartrate of potass, and expose in a flat glass vessel, with a pint of the water for twenty days, adding from time to time distilled water to keep it constantly moist. Then boil it with four pints of distilled water for a quarter of an hour, and filter; evaporate in a water bath until the tartarized iron be completely dried. Rub this to powder, and keep it in a well-corked vessel.

TARTARUM FERRI. *Dub.*
Tartar of Iron.

Take of
Carbonate of iron, half an ounce;
Crystals of tartar, in very fine powder, one ounce;
Distilled water, a pint.

Boil them together in a glass vessel over a slow fire for an hour, and filter the liquor through paper. When cool, and filtered a second time, evaporate it until a pellicle appear on the surface. In cooling, it will form a saline mass, which is to be powdered, and kept in close vessels.

This is in fact a triple tartrate of iron and potass, the excess of acid in the supertartrate of potass being saturated by oxide of iron. In the Dublin process the combination is direct; and carbonic acid is evolved.

Dr Perceval says, that the precipitated carbonate was found to answer best, and that it forms a mass of concreted spicular crystals of an olive colour, which attracts humidity from the air. In solution it destroys the colour of litmus, and its taste is rather sweetish than sour.

In the processes of the London and Edinburgh Colleges, the oxidation of the iron takes place slowly from the decomposition of the water and air, assisted by the disposing affinity of the tartaric acid, with which it unites as fast as it is formed. Mr Phillips has examined this preparation attentively. He says, that as usually prepared it has a light green colour, and is readily attracted by the magnet, unalterable by exposure to the air, and with difficulty soluble in water, and that one-fifth of the iron-filings employed remain unaltered, so that it must be considered as merely a mixture of metallic iron with supertartrate of potass, coloured by oxide of iron.

Mr Phillips recommends the tartrate to be dissolved as soon as it is formed, and kept in the state of solution: as when perfect it cannot be given in the state of powder on account of its attracting moisture, and after being dried, it does make a perfect solution. Seven times its weight of water easily dissolves the tartarized iron by trituration, and the solution readily passes through the filter, and contains one-eighth part of its weight of tartarized iron, or nearly 16 grains of oxide in the fluidounce. This solution is of a deep greenish-brown colour, remains for a great length of time without undergoing any change, except at first the deposition of the tartrate of lime of the tartar. It is precipitated by alcohol, and decomposed by lime-water, by solutions of potass and soda; and by their subcarbonates, when heated, but not when cold; nor by ammonia or its subcarbonate, hot or cold. It is not crystallizable, but when dried is of a dark greenish-brown colour, and attracts moisture from the atmosphere, but does not deliquesce, is exceedingly tenacious, resembling gum, and can scarcely be made to form a perfect solution.

Med. use.—The advantage of exhibiting this preparation in solution is, that when the acid is perfectly saturated, the taste of the iron is scarcely perceptible; and hence it can be exhibited with success to persons to whom the common solutions of iron are nauseous. It deserves notice, that when there is acid in excess, the taste of the iron is much more easily detected.

VINUM FERRI. *Lond.*
Wine of Iron.

Take of
- Iron, one drachm;
- Supertartrate of potass, in powder, six drachms;
- Distilled water, two pints, or as much as may be necessary;
- Proof spirit, twenty fluidounces.

Triturate together the iron and supertartrate of potass; and expose in an open glass vessel with a fluidounce of water to the air for six weeks, stirring the mass daily with a spatula, and adding distilled water occasionally to keep it moist. Then dry with a gentle heat, rub to powder, and mix with thirty ounces of distilled water. Filter the liquor, and add to the filtered liquor the spirit.

Dub.

Take of
- Iron wire, cut in pieces, four ounces;
- White Rhenish wine, four pints.

Sprinkle the iron with a bottle of the wine, and expose it to the air until it be covered with rust; then add the rest of the wine; digest for seven days, with occasional agitation, and filter.

In the Dublin process the iron is first oxidized, and then dissolved in the wine by means of the supertartrate of potass it contains. The Rhenish wine directed by the Dublin College will, therefore, dissolve a larger quantity of iron than the Spanish white wine formerly used by the London College. According to Mr Phillips, a pint of sherry dissolves only about two grains of carbonate of iron; but if soft iron be used, it contains about twenty-two grains of peroxide. In the formula of the London College, a much more uniform and perfect article is obtained. A tartrate of iron and potass is first prepared in the usual way, dried and dissolved in water, to which a proportion of alcohol is added. Mr Phillips finds that a pint of this new preparation contains only 16 grains of peroxide; while 22 were in the former *Vinum ferri.* It is a solecism in language to retain the appellation of *Vinum* to the London preparation: it should be *Solutio.*

Med. use.—The dose is from a drachm to half an ounce, repeated twice or thrice a-day, in chlorotic cases.

ACETAS FERRI. *Dub.*
Acetate of Iron.

Take of
  Carbonate of iron, half an ounce;
  Acetic acid, three ounces by measure.
Digest for three days, and strain.

Dr Perceval found, that in experiments made to determine the comparative solubility of iron in its different states in acetic acid, that two drachms of the acid acquired a light amber tinge from ten grains of scales of iron, and left a residuum of $9\frac{1}{2}$; a reddish amber colour from iron-filings, residuum $6\frac{3}{4}$; a light red from the red oxide, residuum $8\frac{3}{4}$; and from the precipitated carbonate a deep claret colour, and the whole was dissolved. Hence the last was preferred for making directly an acetate of iron.

TINCTURA ACETATIS FERRI. *Dub.*
Tincture of Acetate of Iron.

Take of
  Acetate of kali, two ounces;
  Sulphate of iron, one ounce;
  Rectified spirit of wine, two pints.
Rub the acetate of kali and sulphate of iron in an earthenware mortar, until they unite into a soft mass; then dry it with a moderate heat, and triturate it, when dried, with the spirit. Digest the mixture in a well-corked phial for seven days, shaking it occasionally. Lastly, after the fæces have subsided, pour off the limpid liquor.

IN this process sulphate of potass and acetate of iron are formed. The former being insoluble in alcohol, is very sparingly dissolved in the spirit; and as the iron in the sulphate, though in the state of black oxide, has a strong attraction for oxygen, it is probable that the acetate prepared in the way directed is a mixed acetate.

In the London Pharmacopœia 1746, a *Tinctura Saturnina* was extracted from a mixture of acetate of lead and sulphate of iron. This was, in fact, a tincture of acetate of iron contaminated with a little lead. Dr Perceval substituted in his practice a preparation of Glauber's, by using equal weights of acetate of potass and sulphate of iron. This tincture, if made with rectified spirit, grows turbid by keeping, and deposites an oxide of iron, which does not happen when alcohol, sp.gr. 0.815, is employed. But Mr Watts discovered, that by using two parts of acetate of potass to one of sulphate of iron, a permanent tincture may be extracted by rectified spirit. It contains acetate of potass as well as of iron, for its extract is whitish, from a predominance of the former. A drachm measure gave gr. $\frac{16}{20}$ of prussiate of iron, by precipitation.

Med. use.—It has an extremely styptic taste, and is given in doses of thirty or forty drops.

Dr Perceval says it is an elegant, agreeable, and useful chalybeate preparation, of which a tea-spoonful or two may be conveniently taken in asses milk.

TINCTURA ACETATIS FERRI CUM ALCOHOL. *Dub.*
Tincture of Acetate of Iron with Alcohol.

Take of
Acetate of kali, one ounce;
Sulphate of iron, one ounce;
Alcohol, one pint.

Rub the acetate of kali and sulphate of iron in an earthenware mortar until they unite into a soft mass; dry this with a moderate heat, and triturate it when dried with the alcohol. Digest the mixture in a well-corked phial for twenty-four hours, shaking it occasionally. Lastly, after the fæces have subsided, pour off the liquid liquor.

THE strong alcohol, used in this preparation, is incapable of dissolving the green salts of iron, but dissolves the red salts readily. This tincture contains a very pure peracetate of iron, more perfectly neutralized than most metallic salts. Its extract is of a beautiful crimson colour, which does not crystallize, but first assumes the consistence of wax, and then dries transparent, an ounce measure affording ten grains.

LIQUOR FERRI ALKALINI. *Lond.*
Solution of Alkaline Iron.

Take of
Iron, two drachms and a half;
Nitric acid, two fluidounces;
Distilled water, six fluidounces;

Solution of subcarbonate of potass, six fluidounces.

Mix the water and acid, and pour them upon the iron. As soon as the effervescence has ceased, pour off the acid solution; add this gradually, and at intervals, to the solution of subcarbonate of potass, stirring it occasionally, until after having become of a dark red colour, no more effervescence be excited. Lastly, let it stand for six hours, and pour off the solution.

In the first part of this singular process, the iron is oxidized and dissolved by the nitric acid, with the evolution of red fumes. In the second part, a solution of subcarbonate of potass is added, which at first precipitates percarbonate of iron, but on the further addition of the alkaline solution, the precipitate is redissolved, and a clear deep red solution is obtained, from which nitrate of potass crystallizes and is to be separated. The chemical nature of the composition has not been accurately ascertained, and the preparation is attended with considerable difficulty and uncertainty. Dr Powell says, that the solution of the iron should be made slowly, and that it ought not to be nearly saturated, but have an excess of acid; that it ought to be clear, and slightly greenish, and if, by excess of iron, it have a reddish-yellow colour, a little acid is to be added, which will bring it to the proper state; that the acid solution should be added gradually to the alkaline, although it will succeed the other way; and that although the proportions are pretty nearly given, they require to be checked by occasional examination, especially by the taste, which should be slightly alkalescent. Mr Phillips, in his remarks upon this preparation, says, that there is no danger of iron being dissolved in excess, as the acid is capable of dissolving more than twice the quantity of iron ordered; and the solution thus obtained, though so nearly saturated as to excite little effervescence when added to the solution of carbonate of potass, answers perfectly well for making this preparation; but even when the proportions of the college are adopted, the quantity of alkali is too small, although more than requisite to saturate the acid, and to give a decided alkaline taste, and it is necessary to use about one-twelfth more than is directed, in order to dissolve the oxide of iron. Mr Phillips conjectures that it may be a double salt, composed of pernitrate of iron and carbonate of potass, and states, that at any rate it consists essentially of a solution of peroxide of iron in subcarbonate of potass. Hagen says, that the preparation does not succeed with caustic potass; and that the more the alkali is carbonated, the better.

It has the inconvenience of being very easily decomposed, so that, according to Dr Paris, it cannot be exhibited in any form without decomposition; and Mr Phillips remarks, that if five parts of water be added to one of this preparation, in a few minutes the oxide of iron is almost entirely precipitated.

Med. use.—We have many examples of very unchemical compounds being very useful remedies; and in ascertaining the virtues of medicines, we must always have recourse to the test of experience. Dr Powell considers it as affording a combination of iron distinct from any other, and often applicable to practice; and adds, "If I was to speak individually of its powers, I should consider them as more considerable than those of any other preparation of the metal in many cases attended with debility of stomach, and it has been also prepared in some large shops, and not unfrequently employed."

CHAP. XI.—MERCURY.

HYDRARGYRUM PURIFICATUM. *Dub.*
Purified Quicksilver.

Take of
  Quicksilver, six pounds.
Draw off four pounds by slow distillation.

Lond.

Put quicksilver into an iron retort, and by the application of heat, distil purified quicksilver.

Edin.

Take of
  Quicksilver, six parts;
  Filings of iron, one part.
Rub them together, and distil from an iron vessel.

THE quicksilver of commerce is often adulterated with lead, tin, or other metals, which renders it unfit for internal use, and for many preparations. It therefore becomes necessary to purify it, and fortunately, its comparatively great volatility enables us to do this in a certain degree. The London and Dublin Colleges distil it simply without any addition; the former drawing off the whole, the latter only two-thirds, lest towards the end of the process the mercury should elevate any impurities along with it. The principal objection to this process is the want of economy; for although the remaining third may be used for some purposes, its value is very much depreciated. As iron has a stronger affinity for some of the substances with which quicksilver may be adulterated, than quicksilver has, by adding iron-filings as directed by the Edinburgh College, we may draw off the whole quicksilver by distillation, with less fear of the impurities rising along with it.

Glass retorts are inadmissible in this distillation; because, when the mercury begins to boil, they would certainly be broken by the concussion. Iron retorts are the best, although strong earthen ones may also be used. The receiver may be of the same materials, or of glass, if we wish to inspect the progress of the operation; but, in this case, we must interpose an adopter between the retort and receiver, and fill the receiver nearly full of water, that the mercury may not crack it, by falling hot into it. The retort employed should be so large, that the quicksilver should not fill above one-third of it.

Another mode of partially purifying quicksilver is by agitating it with strong sulphuric acid, which forms a saline powder with some of the baser metals, easily removed by washing and filtration. The thermometer makers find it necessary to treat even distilled mercury in this way, and always obtain a saline powder.

Pharm. use.—It is the basis of all the preparations in this chapter.

ACETAS HYDRARGYRI. *Ed.*
Acetate of Quicksilver.

Take of

Purified quicksilver, three ounces;
Diluted nitrous acid, four ounces and a half, or a little more than may be required for dissolving the mercury;
Acetate of potass, three ounces;
Boiling water, eight pounds.

Mix the quicksilver with the acid; and after the effervescence has ceased, digest, if necessary, with a gentle heat, until the quicksilver be entirely dissolved. Then dissolve the acetate of potass in the boiling water, and immediately to this solution, still hot, add the former, and mix them by agitation. Then set the mixture aside to crystallize. Place the crystals in a funnel, and wash them with cold distilled water; and, lastly, dry them with as gentle a heat as possible.

In preparing the acetate of quicksilver, the whole vessels and funnels used must be of glass.

ACETAS HYDRARGYRI. *Dub.*
Acetate of Quicksilver.

Take of
Purified quicksilver, three ounces by weight;
Diluted nitrous acid, three ounces, by measure;
Acetate of kali, three ounces;
Boiling distilled water, eight pints.

Add the acid to the quicksilver; and after the effervescence has ceased, digest upon hot sand, that the metal may be dissolved. Instantly mix the liquor with the boiling water, in which the acetate of kali has been previously dissolved, and filter as quickly as possible, through double linen. Let it form crystals by cooling, which, after being washed in cold distilled water, are to be dried on paper, with a very gentle heat.

In the whole of this process glass vessels are to be used.

THESE processes are fundamentally the same. They differ chiefly in the proportions. The Edinburgh College orders a larger proportion of acid, but it was ascertained by very careful experiment to be necessary; and if its directions be accurately followed, the preparation succeeds perfectly. Nitrate of mercury is first formed, and then decomposed by acetate of potass; and the products are acetate of mercury and nitrate of potass. The nitrate of potass, being much more soluble than the acetate of mercury, remains in solution after the latter is separated by crystallization.

Mercury is capable of forming different combinations with nitrous acid. When we employ a quantity of acid sufficient to dissolve the mercury without the assistance of heat, and to retain it in solution, there is always an excess of acid, and therefore it is a solution of supernitrate of protoxide of mercury. If we evaporate this solution very gently, or, if we add an additional quantity of mercury, and assist the action of the acid by a gentle heat, until nitrous gas begin to escape, we obtain protonitrate of mercury, crystallized in various forms.

But if we promote the action of the acid by boiling, until nitrous gas ceases to escape, the mercury is converted into peroxide, and a larger quantity of the metal is dissolve This solution is very apt to crystallize, both on cooling, an by the diminution of the quantity of acid and water durin the process; and if we attempt to dilute the solution wit water, a copious precipitate of subnitrate of peroxide of mercury immediately takes place; and the solution contains supernitrate of peroxide of mercury. If the dilution be mad with cold water, the subnitrate has a white colour, which, b a very slight application of heat, passes to a beautiful yellow If the dilution be attempted with the boiling water, the precipitate is yellow from the first.

For making the acetate of mercury, the nitrate is prepared with a very gentle heat, and with excess of acid, that i may be retained in perfect solution, and that there may b no possibility of any admixture of subnitrate with the acetat formed. In mixing the solutions, we must be careful to pou the mercurial solution into that of the acetate of potass, because, by adopting the contrary procedure, the subnitrate o mercury will be precipitated undecomposed, if any peroxid be contained in the mercurial solution. As much water i used for dissolving the acetate of potass as is capable of retaining, so long as it is hot, the acetate of mercury in solution, and of allowing it to crystallize as it cools. In thi way, therefore, it is procured at once sufficiently pure. Th exsiccation of the acetate of mercury is an operation of great delicacy; for it is so spongy, that it retains the moisture with great obstinacy; and it is decomposed so easily, that heat can scarcely be employed to dry it. It is best dried by compressing it between several folds of bibulous paper.

Mr Phillips objects to this process, the excess of nitric acid used, as tending to form peroxide of mercury, which is to be avoided; and he proposes that less water should be used, or the solution evaporated to obtain more acetate, and that the peroxide always formed should be recovered by precipitation, and used for preparing the *oxidum hydrargyri rubrum*.

It is unquestionably true, that the product of acetate of mercury obtained is small in proportion to the quantity of mercury used; but in this, as in various other processes, the manufacturer is understood to possess knowledge enough of his profession to turn a valuable residuum to the best account, and perhaps he cannot do better than by adopting Mr Phillips's suggestions; but I know that many attempts have been made to improve the process of the college, and that they have all failed. The excess of acid is necessary, because it is impossible to dissolve mercury by nitrous acid without the formation of peroxide, which would be precipitated by the water of the saline solution, into which it is poured, if it were not retained in solution in the state of a supernitrate by the excess of acid. Finally, the quantity of water used for dissolving the acetate of potass cannot be diminished without deteriorating the appearance of the product, on which its mercantile value entirely depends.

The Prussian Dispensatory directs acetate of mercury to be prepared by dissolving two ounces of the red oxide of mercury in about seven ounces of concentrated acetic acid, and evaporating the solution to dryness; but this process affords a salt of a very different nature from those prepared according to the directions of the British Colleges, the latter containing protoxide, and being crystallizable (proto-acetate), and the former the peroxide, and not crystallizable (peracetate.)

Acetate of mercury is scarcely soluble in cold water, but dissolves readily in boiling water. It generally crystallizes in micaceous plates, like boracic acid, and is extremely easy of decomposition.

It is supposed to be a mild preparation of mercury, and was the active ingredient of the celebrated Keyser's pills. In solution, it has also been recommended externally, to remove freckles and cutaneous eruptions; but it is little used.

MURIAS HYDRARGYRI CORROSIVUS. *Ed.*
Corrosive Muriate of Quicksilver.

Take of
- Purified quicksilver, two pounds;
- Sulphuric acid, two pounds and a half;
- Dried muriate of soda, four pounds.

Boil the quicksilver with the sulphuric acid in a glass vessel, placed in a sand-bath, until a dry mass remain, which when cold is to be mixed in a glass vessel, with the muriate of soda; then sublime in a glass cucurbit, with a heat gradually increased. Lastly, separate the sublimed matter from the scoriæ.

HYDRARGYRI OXYMURIAS. *Lond.*
Oxymuriate of Quicksilver.

Take of
- Purified quicksilver, two pounds;
- Sulphuric acid by weight, thirty ounces;

Dried muriate of soda, four pounds.

Boil the quicksilver with the sulphuric acid, in a glass vessel, until the sulphate of quicksilver be reduced to dryness; triturate this after it has cooled, in an earthen mortar, with the muriate of soda; then sublime it from a glass cucurbit, with a gradually increased heat.

MURIAS HYDRARGYRI CORROSIVUM. *Dub.*
Corrosive Muriate of Quicksilver.

Take of
Purified quicksilver, two pounds;
Sulphuric acid, three pounds;
Dried muriate of soda, two pounds and a half.

Dissolve the quicksilver in the acid, and gradually increase the heat, until the mass become perfectly dry; when cold, triturate it in an earthen mortar, with the muriate of soda; then sublime in a proper vessel, with a heat gradually increased.

BY boiling the quicksilver to dryness with sulphuric acid, the metal is oxidized by the decomposition of part of the acid, and combines with the rest to form supersulphate of peroxide of quicksilver. In the second part of the process, the supersulphate is decomposed by dried muriate of soda, permuriate of quicksilver sublimes, and sulphate of soda remains behind; or, according to the modern doctrines of chemistry, the oxygen of the peroxide of mercury in the supersulphate combines with the sodium of the sea salt (chloride of sodium) to form soda, which unites with the sulphuric acid to form sulphate of soda; and the chlorine and sodium combine and are sublimed to form the bichloride of sodium, the object of the process. Dr Fife tells me that the quantity of sulphuric acid ordered is insufficient to dissolve the whole mercury. This is a loss, as no harm can arise from excess of acid. Mr Phillips thinks that a great deal too much salt, at least one half too much, is used; but Dr Hope contends, that it is necessary that no part of the sulphate of mercury may suffer the subliming temperature free from the contact of muriate of soda. In Holland, corrosive sublimate is manufactured by subjecting to sublimation a mixture of dried sulphate of iron, nitrate of potass, muriate of soda, and quicksilver. Bergman recommends the sublimation of subnitrate of mercury and muriate of soda; and Dr Murray was inclined to prefer it to the new process. It is prepared also directly, by dissolving red oxide of mercury in muriatic acid.

Muriate of quicksilver crystallizes by sublimation, in prismatic needles, forming a white semi-transparent ponderous mass. Its taste is acrid, styptic, and durable. It is soluble in 20 parts of cold water, and in 2 at 212°. It is also soluble in 3.8 parts of alcohol, at 70°, and in almost an equal weight of boiling alcohol. It gives a green colour to syrup of violets. It is not altered by exposure to the air, and is sublimed unchanged by heat. It is not decomposed by any of the acids, but is soluble, without alteration, in the sulphuric, nitric, and muriatic acids. It is precipitated by all the alkalies and earths, of an orange-yellow colour, which gradually changes to a brick-red; and, by their carbonates, of a permanent yellow colour. Ammonia forms with it an insoluble, white, triple salt. It is also decomposed by several of the metals. It consists, according to Mr Zaboada, of 71.5 quicksilver, combined with 8.5 of oxygen, and 20 muriatic acid. Sir H. Davy considers it as a compound of metallic mercury and chlorine, in the proportion of one prime of mercury to two of chlorine, or 25 to 9 = 34, and, according to his nomenclature, it is now called Bichloride of mercury.

Medical use.—Muriate of mercury is one of the most violent poisons with which we are acquainted. Externally, it acts as an escharotic or a caustic; and in solution it is used for destroying fungous flesh, and for removing herpetic eruptions; but even externally it must be used with very great caution. It has, however, been recommended to be given internally by the respectable authorities of Boerhaave and Van Swieten; and it is the active ingredient of all the empirical antivenereal syrups. Were it really capable of curing the venereal disease, or equal in efficacy to the common modes of administering mercury, it would possess many advantages over them in other respects; but that it cannot be depended upon, is almost demonstrated by its use, as an antivenereal, being very much confined in this country to the empirics, and by the testimony of the most experienced practitioners. Mr Pearson says, that it will sometimes cure the primary symptoms of syphilis, especially if it produce considerable soreness of the gums, and the common effects of mercury; but that it will often fail in removing chancre, and where it has removed it, that the most steady perseverance will not secure the patient from a constitutional affection. It is, on some occasions, however, a useful auxiliary to a mercurial course, in quickly bringing the system under the influence of mercury, and in supporting its action after the use of frictions; and it is peculiarly efficacious in relieving venereal pains, in healing ulcers of the throat, and in promoting the desquamation of eruptions. In cases of poisoning from corrosive sublimate, Orfila recommends the liberal use of albuminous fluids as the best antidote. The corrosive sublimate is immediately converted into calomel.

LIQUOR HYDRARGYRI OXYMURIATIS. *Lond.*

Solution of Oxymuriate of Quicksilver.

Take of
Oxymuriate of quicksilver, eight grains;
Distilled water, fifteen fluidounces;
Rectified spirit, one fluidounce.

Dissolve the oxymuriate of quicksilver in the distilled water, and add to it the spirit.

THIS solution contains in each fluidounce half a grain of the oxymuriate of quicksilver. Common water will not do for this solution, as it decomposes the mercurial salt. The spirit is added to preserve the solution from spoiling.

SUBMURIAS HYDRARGYRI MITIS, sive CALOMELAS. *Ed.*

Mild Submuriate of Quicksilver, or *Calomel.*

Take of
Muriate of quicksilver, four parts;
Purified quicksilver, three parts.

Triturate finely in a glass mortar the muriate with a little water, to prevent the acrid powder from rising, then add the quicksilver, and triturate again until the mercury be extinguished; and having put the powder, after being dried, into an oblong phial, of which it fills only one-third, sublime from warm sand. Reduce the sublimate to powder, and sublime it a second time. Grind this sublimate into a very minute powder, which is, lastly, to be washed with boiling distilled water.

SUBMURIAS HYDRARGYRI SUBLIMATUM, sive CALOMELAS. *Dub.*

Sublimed Submuriate of Quicksilver, or *Calomel.*

Take of
Corrosive muriate of mercury, one pound;
Purified quicksilver, nine ounces.

Rub them together, until the globules disappear, and sublime, with a sufficiently strong heat. Triturate the sublimed matter, and repeat the sublimation. Powder it, and wash with frequent affusions of distilled water, until the liquor poured off is not affected by some drops of water of carbonate of kali. Then dry.

HYDRARGYRI SUBMURIAS. *Lond.*
Submuriate of Quicksilver.

Take of
 Purified quicksilver, four pounds ;
 Sulphuric acid, by weight, thirty ounces
 Muriate of soda, one pound and a half;
 Muriate of ammonia, eight ounces.

Boil two pounds of the quicksilver with the sulphuric acid in a glass vessel, until the sulphate of quicksilver be rendered dry. Rub this, when it has become cool, with the other two pounds of quicksilver in an earthen mortar, until they be intimately mixed. Then add the muriate of soda, and rub them together until the globules entirely disappear; then sublime.

Triturate the sublimate into a very subtile powder, pass it through a sieve, and wash it with the muriate of ammonia previously dissolved in a gallon of distilled water, set aside until the powder subside; decant off the liquor, and wash the powder with boiling distilled water repeatedly until it give no precipitate, on the addition of the solution of ammonia. Lastly, reduce it to a very fine powder, in the manner directed for the preparation of chalk.

WHEN, according to the Edinburgh and Dublin process, quicksilver is triturated with muriate of quicksilver, it abstracts from the oxidized quicksilver of the muriate a part of its oxygen, and the whole mass assumes a blackish-grey colour. When this is exposed to a degree of heat sufficient to convert it into vapour, the action of the different portions of quicksilver upon each other, and upon the muriatic acid, is more complete; and the whole is converted into a solid white mass, consisting of mercury in a state of less oxidizement, and combined with less acid, than in the muriate, or of about twice the quantity of mercury, with the same quantity of oxygen and acid. According to Sir H. Davy's theory, in the first part of the process, the additional mercury is merely mechanically divided, and by the sublimation twice the quantity of mercury is combined with the same quantity of chlorine.

The trituration of the muriate of mercury is a very noxious operation, as it is almost impossible to prevent the finer particles from rising and affecting the operator's eyes and nostrils. To lessen this evil, the Edinburgh College directs the addition of a little water. In the second part of the process, when the heat is applied, a small portion of quicksilver and undecomposed muriate first arise, and condense themselves in the highest part or neck of the phial; then the submuriate rises, and, being less volatile, condenses in the upper half of the body, while a small quantity of quicksilver, in a state of considerable oxidizement, remains fixed, or near the bottom. As in the first sublimation, a portion of the quicksilver and of the muriate of quicksilver always arise undecomposed, a second sublimation is necessary, especially if we triturate the whole products of the first sublimation together: but any farther repetition of the process is perfectly useless. Lest any portion of muriate should have escaped decomposition, the submuriate must be edulcorated with boiling distilled water, until the water which comes off forms no precipitate with alkalis.

The new London process is derived from Hermbstaedt's, published in previous editions of this Dispensatory. There is first formed a dry persulphate. This is then triturated with a second proportion of mercury, which divides the oxygen and acid, forming a protosulphate, which yields a chloride, by being sublimed with chloride of sodium.

A very ingenious method of condensing the sublimed calomel in a state of minute division, and necessarily free from any admixture of corrosive sublimate, has been invented by Mr Jewell, and has been adopted into the French Pharmacopœia. It consists in causing the calomel in vapour to come in contact with steam, and to be condensed in an impalpable powder in water. It has got the name of Howard's or Jewell's Hydrosublimate of mercury.

Submuriate of mercury is generally obtained in the form of a white solid mass, but is capable of crystallizing in tetrahedral prisms terminated by pyramids. It has no taste, and is scarcely soluble in water or in alcohol. It is less volatile than muriate of mercury. It is blackened by light, and becomes brown or black when triturated with lime water or the alkalies. It is converted by oxymuriatic acid into muriate of quicksilver. According to Mr Chenevix, it consists of 79 quicksilver, with 9.5 oxygen, and 11.5 muriatic acid, which Dr Thomson says is very near the truth.

Sir H. Davy considers the muriate (bichloride) as consisting of one proportion of mercury 25, and two of chlorine 9=34, and the submuriate (chloride) of one of mercury 25, and one of chlorine 4.5=29.5; which gives us 73.5 as the quantity of mercury necessary to convert 100 of muriate into submuriate.

Medical use.—The submuriate of quicksilver is one of the best mercurials we possess. By proper management it may be made to increase, in a remarkable manner, almost any of the secretions or excretions. One grain mixed with sugar, and snuffed up the nostrils, is recommended as a powerful errhine in amaurosis. The same mixture is blown into the eye, to remove specks from the cornea. Given in doses of one grain morning and evening, or in large doses combined with opium, to prevent it from acting as a purgative, it excites ptyalism. In larger doses of five grains and upwards, it is an excellent purgative. Combined with diuretics, it proves diuretic, and with sudorifics, sudorific.

It is one of the preparations of mercury which is capable of curing syphilis in every form. It also produces very powerful and salutary effects in obstructions and chronic inflammations of the viscera, especially of the liver; and, in general, it is applicable to every case in which mercurials are indicated.

SUBMURIAS HYDRARGYRI PRÆCIPITATUS. *Ed.*

Precipitated Submuriate of Quicksilver.

Take of
Diluted nitrous acid,
Purified quicksilver, of each eight ounces;
Muriate of soda, four ounces and a half;
Boiling water, eight pounds.

Mix the quicksilver with the acid, and, towards the end of the effervescence, digest with a gentle heat, frequently shaking the vessel in the meantime. But it is necessary to have added more quicksilver to the acid than it is capable of dissolving, that a perfectly saturated solution may be obtained.

Dissolve at the same time the muriate of soda in the boiling water, and into this solution pour the other while still hot, and mix them quickly by agitation; pour off the saline liquor after the precipitate has subsided, and wash the submuriate of quicksilver by repeated affusions of boiling water, which is to be poured off each time after the deposition of the submuriate, until the water comes off tasteless.

SUBMURIAS HYDRARGYRI PRÆCIPITATUM. *Dub.*
Precipitated Submuriate of Quicksilver.

Take of
Purified quicksilver, seven ounces, by weight;
Diluted nitrous acid, five ounces, by measure.

Pour the acid upon the quicksilver in a glass vessel; and when the mixture has ceased to effervesce, digest in a moderate heat, with occasional agitation, for six hours. Then increase the heat, until the liquor boil a little, which is to be poured off from the quicksilver which remains, and quickly mixed with a boiling solution already prepared, of
Muriate of soda, four ounces;
Water, ten pounds.

Wash the powder which subsides, with warm distilled water, as long as the liquor decanted from it is precipitated by some drops of the liquor of water of carbonate of kali; then dry it.

IN the first part of this process, a saturated solution of nitrate of quicksilver is formed; and the proportions used are such that a small quantity of mercury remains undissolved. In the second, there is a mutual decomposition of this nitrate, and of the muriate of soda; nitrate of soda is formed, and muriate of quicksilver with excess of oxide; or, according to Sir H. Davy, the chloride of sodium on being dissolved is converted into muriate of soda by decomposing water; and on being mixed with the solution of nitrate of mercury, the chlorine and mercury are precipitated in the state of insoluble chloride, while their hydrogen and oxygen unite to form water, and the soda combines with the nitric acid.

In this preparation, our object is to obtain the insoluble compound which results from the combination of the protoxide of mercury with muriatic acid, or, according to the modern doctrine, of mercury with *one* proportion of chlorine. In this view, the application of heat, in dissolving the mercury in the nitrous acid, is improper; for a portion at least of the mercury is converted into its peroxide, which occasions, in the first place, the formation of a little subnitrate of mercury, when poured into the saline solution; and, secondly, the formation of a proportion of bichloride of mercury (corrosive sublimate,) which must be washed away. Accordingly, Dr Murray found, that more of mild, and less of corrosive muriate of mercury are formed, when the solution is made slowly in the cold, than when the directions of the colleges are complied with. Mr Philips found, that even when more mercury is used than the acid can dissolve, a arge portion of peroxide of mercury is formed, which can e thrown down by an alkali after the precipitation of the alomel. 48 parts of mercury gave 15 of peroxide, after he calomel had been separated.

In Sir H. Davy's view of the subject, according to which alomel and corrosive sublimates are compounds of metallic nercury, with different proportions of chlorine, the object n this preparation is to get the largest quantity of mercury lissolved in the nitrous acid, so that in decomposing muriite of soda, the smallest quantity of chlorine may be set at iberty; and as the peroxide contains twice as much oxygen s the protoxide, and acids seem to combine with a certain uantity of oxygen in oxides, whatever be the quantity of netal united with it, the nitrate of the protoxide of mercury vill contain twice as much mercury as the nitrate of the eroxide, and will of course give a double proportion of nercury to the chlorine set at liberty from the muriate of oda.

When properly prepared, the submuriate obtained by recipitation scarcely differs from that obtained by sublimaion. Göttling found no other difference than that the preipitated submuriate becomes grey, when triturated with ime-water, whereas the sublimed submuriate becomes black. But he exposed to heat half an ounce of the precipitated ubmuriate in a subliming apparatus; scarcely a grain of a eddish matter remaining fixed; and the sublimed matter iow became black when triturated with lime water, and difered in no respect from submuriate prepared in the ordiiary way by sublimation. It therefore would seem to be an mprovement in the process, to sublime the submuriate after t is precipitated, especially as by that operation it would e most effectually separated from any subnitrate which night be mixed with it.

SUBMURIAS HYDRARGYRI AMMONIATUM. *Dub.*
Ammoniated Submuriate of Quicksilver.

Add to the liquor decanted from the precipitated submuriate of quicksilver, as much water of caustic ammonia as is sufficient to precipitate the whole metallic salt. Wash the precipitate with cold distilled water, and dry it on blotting paper.

The solution from which the precipitated submuriate of the Dublin College has been separated retains some muriate of mercury in solution. On the addition of ammonia, a triple salt, the submuriate of mercury and ammonia, is formed, which is a white insoluble powder. This process has the merit of being economical, as it turns to good account the residuum of another process.

HYDRARGYRUM PRÆCIPITATUM ALBUM. *Lond.*
White Precipitated Quicksilver.

Take of
 Oxymuriate of quicksilver, half a pound;
 Muriate of ammonia, four ounces;
 Solution of subcarbonate of potass, half a pint;
 Distilled water, four pints.

Dissolve first the muriate of ammonia, and afterwards the oxymuriate of quicksilver, in the distilled water, and add to these the solution of subcarbonate of potass. Wash the precipitate until it become insipid, and then dry it.

MURIATE of quicksilver is about thirty times more soluble in a solution of muriate of ammonia than in pure water; and, during the solution, there takes place a considerable increase of temperature. This compound may be termed Muriate of mercury and ammonia. It is the *Sal Alembroth* of the alchemists. It is very soluble in water, and is sublimed by heat without decomposition. When to a solution of this salt we add a solution of an alkaline carbonate, either of potass, as directed by the London College, or of soda, as by that of Berlin, there occurs a partial decomposition. The alkali combines with a portion of the muriatic acid, and reduces the muriate of mercury and ammonia to the state of a submuriate, which being insoluble, falls to the bottom of the solution. The proportion of muriate of ammonia employed was reduced in edition 1815 to one-half, probably in consequence of a remark of Mr Phillips.

The submuriate of mercury and ammonia, has at first an earthy, and afterwards a metallic taste. It is not soluble in water. It is decomposed by heat, furnishing water, ammonia, and nitrogen gas, while 0.86 of submuriate of mercury remain behind. Sulphuric and nitric acids partially decompose it, and convert it into muriate of mercury, and triple salts of mercury and ammonia. Muriatic acid dissolves it, and converts it into muriate of quicksilver and ammonia. According to Fourcroy's analysis, it consists of 81 oxide of mercury, 16 muriatic acid, 3 ammonia $=100$.

Pharm. use.—It is only used for ointments; and its principal recommendation is its white colour.

OXIDUM HYDRARGYRI CINEREUM. *Ed.*
Ash-coloured Oxide of Quicksilver.

ake of
Submuriate of mercury, half an ounce;
Lime water, five pounds.

oil the submuriate in the lime water for a quarter of an hour in a lightly covered vessel. After it settles, pour off the liquor, and wash the oxide with distilled water, and then dry it.

Lond.

ake of
Submuriate of quicksilver, one ounce;
Lime water, one gallon.

oil the submuriate of quicksilver in the lime-water, with constant stirring, until the grey oxide of mercury subside; wash this with distilled water, and then dry.

PULVIS HYDRARGYRI CINEREUS. *Dub.*
Ash-coloured Powder of Quicksilver.

ake of
Quicksilver, two ounces, by weight;
Diluted nitrous acid, two ounces, by measure.

issolve the quicksilver with a low heat, and dilute the liquor with eight ounces, by measure, of cold distilled water; then drop it into an ounce and a half, by measure, of the water of carbonate of ammonia, or as much as may be sufficient to precipitate the metal, which is to be washed with warm distilled water, until the decanted liquor is not precipitated by some drops of water of sulphuret of ammonia; and afterwards dry it.

THESE processes are intended to furnish a substitute for he black oxide of quicksilver, on which the efficacy of the ercurials most frequently employed, and most certainly useul, is supposed to depend.

In the latter of these processes, it was supposed, that as mmonia has a stronger affinity for nitric acid than oxide f mercury has, it would separate oxide of mercury from its olution in nitric acid; and, therefore, that the precipitate btained was oxide of mercury, similar to that formed by triuration. But, since the nature of the triple metallic salts has een better understood, this has been discovered to be an eror. The grey precipitate which is formed may, generally peaking, be called a subnitrate of mercury and ammonia;

for it consists of oxide of mercury and ammonia, not saturate with nitric acid; but, even to ocular inspection, it does no seem to be homogeneous. When boiled long and violentl in water, a portion is dissolved, and the residuum is, according to Braamcamp and Sigueira, the pure protoxide. When on the other hand, the grey precipitate is digested in aceti acid, it is partially dissolved, and the residuum acquires very pale, or almost white colour. The portion dissolve seems to be black oxide, and the white residuum to be pur subnitrate of mercury and ammonia, which, according t Fourcroy, crystallizes in brilliant polyhedral crystals, without smell, of an extremely styptic taste, scarcely soluble i water; is decomposed by heat, by the sulphuric and muriatic acids, and by lime, potass and soda; and consists o 68.20 oxide of mercury, 16 of ammonia, and 15.80 of nitri acid. According to these observations, this preparation o the Dublin College ought not to be called the grey oxide o mercury, and is not identical with the black oxide of mercury prepared by trituration. If, however, it answere the same purposes, the identity would be of little consequence; but, from its never having been introduced into general use, although so much more easily prepared, we ma presume that it is not equal in point of efficacy.

Black oxide of mercury may, however, be obtained, according to the direction of Saunders, now adopted by the Londo and Edinburgh Colleges, by triturating with lime-water, an subsequent edulcoration, the sublimed submuriate of mercury, or rather the precipitated submuriate, as proposed b Göttling; and that the decomposition may be more easy an complete, I may suggest, that for this preparation the latte submuriate should not be dried, but should be triturated wit the lime-water as soon as it is edulcorated. This simple blac oxide certainly merits a fair trial.

Mr Phillips recommends the use of a solution of potass instead of lime-water, as more convenient, and as not requiring heat, by which the protoxide of mercury is quickly converted into peroxide.

The black oxide is said, however, by M. Braamcamp an Sigueira-Oliva, to be prepared in the greatest purity, b boiling the ash-coloured oxide of the Dublin College, lon and violently in water, until the triple salt be dissolved o decomposed.

The protoxide of mercury contains 25 of the metal an one of oxygen = 26, which is almost exactly the result of th analysis by M. Sefstrom and Sir H. Davy.

HYDRARGYRUM CUM MAGNESIA. *Dub.*
Quicksilver with Magnesia.

Take of
- Quicksilver,
- Manna, each one ounce;
- Magnesia, half an ounce.

Triturate the quicksilver with the manna, in an earthen-ware mortar, adding some drops of water, to give the mixture the consistence of a syrup, until the metallic globules become no longer visible. Then add, with constant trituration, a drachm of the magnesia. After they are thoroughly mixed, add a pint of warm water, and shake the mixture: then let the liquor rest, and decant the fluid from the sediment as soon as it subsides. Repeat this washing twice, that the manna may be totally washed away, and with the sediment still moist, mix the remainder of the magnesia. Lastly, dry the powder on blotting paper.

HYDRARGYRUM CUM CRETA. *Dub.*
Quicksilver with Chalk.

Is to be prepared in the same manner, only employing precipitated chalk instead of the magnesia.

Lond.

Take of
- Purified quicksilver, by weight, three ounces;
- Prepared chalk, five ounces.

Triturate them together until the globules disappear.

IT is still doubtful, whether the black colour, which mercury acquires on trituration with viscid substances, be owing to its oxidation, or minute mechanical division. According to the former opinion, mercury has a strong affinity for oxygen, and absorbs it slowly from the atmosphere. But the combination may be considerably accelerated by agitation, and still more by triturating quicksilver with any substance which promotes its mechanical division, and thus increases its surface. With this view, quicksilver is triturated with viscid substances, as fats, honey, syrup, &c. or with pulverulent substances, as the chalk in the process of the London College.

The black oxide is the mildest, but, at the same time, the most efficacious, of the preparations of mercury. Combined with magnesia or chalk, it is not in general use; but in the form of the common mercurial pill and ointment, it is more employed than any other preparation of the same metal except calomel.

OXYDUM HYDRARGYRI. *Dub.*
Oxyde of Quicksilver.

Take of
Purified quicksilver, any quantity.

Put it into an open glass vessel, with a narrow mouth an wide bottom. Expose this to about the six-hundredth degree of heat, until the metal be converted into red scale

HYDRARGYRI OXYDUM RUBRUM. *Lond.*
Red Oxyde of Quicksilver.

Take of
Purified quicksilver, by weight, one pound.

Put it into a glass vessel, with a narrow mouth and a broa bottom. Expose this vessel with its mouth open to th six-hundredth degree of heat, until the quicksilver be converted into red scales. Then grind them into a very fin powder.

THIS is an extremely tedious, and therefore expensive, operation, because mercury is incapable of absorbing from the atmosphere the quantity of oxygen necessary to convert it int the red oxide, except when in the state of vapour. But as th form of a vessel which will prevent the dissipation and loss o the mercurial vapour will, at the same time, hinder the fre access and frequent renewal of the air, the operation can onl proceed slowly. The vessel most advantageously employed i a wide flat-bottomed matrass, with a very narrow and almos capillary neck. Only so much mercury is introduced into i as will cover the bottom of the matrass; and the vessel is no inserted in the sand deeper than the mercury stands within it A degree of heat is then applied, sufficient to cause a gentl ebullition in the mercury, which is thus alternately converte into vapour, and condensed again in the upper part of th vessel. While in the state of vapour, it absorbs the oxyge of the air contained in the vessel, by which means it is gradually changed into a black, and then into a red powder; but a complete conversion into the latter state is not effected in less than several months.

Red oxide of quicksilver, thus prepared, consists of small crystalline scales, of a deep red colour, and very brilliant sparkling appearance. By heat, it may be sublimed in the form of a beautiful ruby-coloured vitrified substance. At a red heat it is decomposed, giving out oxygen gas, while the metal is revived, and is immediately volatilized. It is soluble in several of the acids; and during its solution, it does not ecompose them or water. It is easily disoxydized. It consists of mercury 25, and oxygen 2=27.

Medical use.—It is not only an acrid substance, violently urgative and emetic, but even caustic and poisonous. Its inernal use is proscribed; but it is applied externally as an esharotic, being previously triturated to a very fine powder; r it is formed into a stimulating ointment with unctuous ubstances.

OXIDUM HYDRARGYRI RUBRUM per acidum nitricum. *Ed.*

Red Oxide of Quicksilver by Nitric Acid.

Take of

Purified quicksilver, three parts;
Diluted nitrous acid, four parts.

Dissolve the quicksilver, and evaporate the solution, with a gentle heat, to a dry white mass; which, after being ground into powder, is to be put into a glass cucurbit, and to have a thick glass plate laid upon its surface. Then, having adapted a capital, and placed the vessel in a sand-bath, apply a gradually increased heat, until the matter be converted into bright red scales.

HYDRARGYRI NITRICO-OXIDUM. *Lond.*

Nitric Oxide of Quicksilver.

Take of

Purified quicksilver, three pounds by weight;
Nitric acid, one pound and a half by weight;
Distilled water, two pints.

Mix in a glass vessel, and boil until the quicksilver be dissolved, and after the evaporation of the water a white mass remain. Rub this to powder, and put it into another vessel, which must be very shallow; then apply a gentle heat, and gradually increase it until red vapours cease to be emitted.

OXYDUM HYDRARGYRI NITRICUM. *Dub.*

Nitric Oxyde of Quicksilver.

Take of

Purified quicksilver, ten ounces, by weight;
Diluted nitrous acid, ten ounces, by measure.

Mix them in a glass vessel, and dissolve the quicksilver, with a heat gradually increased; then augment the fire until the matter remaining in the bottom of the vessel be converted into red scales.

In the first part of these processes, a fully saturated nitra of mercury is formed. In the second part the metal is ox dized to the maximum by the decomposition of the aci When a sufficient heat is applied, the nitrate of mercury fir melts, then exhales nitrous oxide gas, and changes its colou successively to yellow, orange, and brilliant purple red. well prepared, it should have a crystalline scaly appearanc sublime entirely at a red heat, and be soluble, without an residuum, in nitrous acid.

This is an extremely difficult operation, and skilful operators not unfrequently fail to obtain it of that brilliant crystalline appearance which is esteemed. M. Paysse, who pai great attention to this preparation in Holland, where it i manufactured in large quantities, gives the following directions:—Dissolve 100 pounds of pure mercury in 140 of pur nitrous acid, of sp. gr. 1.3 to 1.37, promoting their actio by a sand-bath; evaporate by distillation, and, when the formation of nitrous gas indicates the decomposition of the nitrate of mercury, remove the receiver, and apply a stead and moderate heat for about eight hours, until a match which has been just blown out, inflames, on being introduce into the matrass, which is a proof that the operation is finished. To its success it is necessary, 1. That the nitrou acid be not mixed with muriatic; 2. That it be sufficientl strong; 3. That the evaporation be conducted with a moderate heat; 4. That the vessel be sufficiently large and flat so that a large surface be exposed, and the whole equall heated; 5. That the heat be gradually augmented; and lastly, That it be steadily maintained the whole time. Tur is the fittest fuel.

According to Fourcroy, it contains no nitrous acid, unless a sufficient heat has not been applied; but, according to many other chemists, it contains some nitrous acid, and differs from the red oxide prepared by the action of heat alone, in always being more acrid.

Medical use.—It is only used as an escharotic, and care must be taken that it is finely levigated, otherwise it only irritates, without destroying the parts to which it is applied. It is a very common application to chancres. Mixed with axunge, it also forms a very valuable stimulating ointment.

SUBSULPHAS HYDRARGYRI FLAVUS. *Ed.*
Yellow Subsulphate of Quicksilver.

Take of
- Purified quicksilver, two parts;
- Sulphuric acid, three parts.

ut them into a glass cucurbit, and boil them in a sand-bath to dryness. Reduce to powder the white matter which is left in the bottom, and throw it into boiling water. A yellow powder will immediately be produced, which must be frequently washed with warm water.

OXYDUM HYDRARGYRI SULPHURICUM. *Dub.*
Sulphuric Oxyde of Quicksilver.

ake of
Purified quicksilver, one pound;
Sulphuric acid, a pound and a half.

issolve in a glass vessel, with a sufficient heat, which is to be gradually increased until the matter be entirely dried. This, upon pouring on it a very large quantity of warm water, will immediately become yellow, and fall into powder, which is to be well triturated with this water, in an earthenware mortar.

fter pouring off the supernatant liquor, wash the powder with warm distilled water, as often as the decanted liquor forms a precipitate, on the addition of some drops of the water of subcarbonate of kali; and, lastly, dry it.

THE action of sulphuric acid on mercury has been exa- ined with considerable attention by Fourcroy. In the ld, they have no action on each other; but on the applica- on of heat, the sulphuric acid begins to be decomposed, sul- hurous acid gas is extricated, and the metal is oxidized, d combines with the undecomposed acid, forming with it white saline mass, covered with a colourless fluid. In this ate it reddens vegetable blues, is acrid and corrosive, does ot become yellow by the contact of the air, and is not de- omposed by water either warm or cold. It is therefore su- ersulphate of quicksilver, and the proportion of the acid excess is variable.

By washing the saline mass repeatedly with small quanti- es of water, it is at last rendered perfectly neutral. It no nger reddens vegetable blues. It is white; it crystallizes plates, or in fine prismatic needles; it is not very acrid; is not decomposed either by cold or boiling water, but is oluble in 500 parts of the former, and in about 250 of the tter. It is much more soluble in water acidulated with sul- huric acid. By Dr Thomson's analysis this protosulphate onsists of protoxide of mercury 26, sulphuric acid 5, and ater 2.25=33.25.

But if, instead of removing the excess of acid from the su- ersulphate of quicksilver, by washing it with water, we continue the action of the heat according to the directions of the colleges, there is a copious evolution of sulphurous acid gas, and the saline residuum is converted into a white mass, which therefore evidently contains both a larger proportion of mercury, and in a state of greater oxidizement, than the salt from which it was formed. Dr Thomson found the composition of the bipersulphate to be, peroxide of mercury 27, sulphuric acid 10, and water 1.125 = 38.125.

The white saline mass thus obtained is farther analysed by the affusion of hot water; for one portion of it is dissolved, while the remainder assumes the form of a beautiful yellow powder. The portion dissolved is said to contain excess of acid. The yellow powder is, on the contrary, the subsulphate, or, according to Dr Thomson, the persulphate, the old turpeth mineral.

Turpeth mineral has a bright yellow colour, a considerably acrid taste, is soluble in 2000 parts of cold water, is also soluble in sulphuric acid slightly diluted, is decomposed by the nitric acid, and forms muriate of quicksilver with the muriatic acid, while the neutral sulphate forms submuriate. It oxidizes quicksilver, and is converted by trituration with it into black powder. At a red heat it gives out oxygen gas, and the metal is revived. It consists of peroxide of mercury 27, and sulphuric acid 5 = 32.

Medical use.—It is a violent emetic, and with this intention is seldom given. It was used in virulent gonorrhœas and other venereal cases, where there was a great flux of humours to the parts. Its action, however, was not always confined to the primæ viæ; it would sometimes excite salivation, if a purgative was not taken soon after it. Its chief use, at present, is in swelled testicle; and it seems to perform the office of a discutient, by the nausea and severe vomiting it excites. It is said likewise to have been employed, with success, in robust constitutions, against leprous disorders, and obstinate glandular obstructions: the dose is from two grains to six or eight. It may be given in doses of a grain or two as an alterative and diaphoretic. Dr Hope senior found, that in doses of one grain, with a little powder of liquorice root, it formed a very convenient and powerful errhine. It has also been recommended as the most effectual preservative against hydrophobia.

On the whole, however, it is a superfluous preparation, whose place may be more safely supplied by other mercurials or emetics.

HYDRARGYRI SULPHURETUM NIGRUM. *Lond.*
Black Sulphuret of Quicksilver.

ake of
Purified quicksilver, one pound, by weight;
Sublimed sulphur, one pound.
riturate them together until the globules disappear.

SULPHURETUM HYDRARGYRI NIGRUM. *Ed.*
Black Sulphuret of Quicksilver.

ake of
Purified quicksilver,
Sublimed sulphur, each equal weights.
rind them together in a glass mortar, with a glass pestle,
till the mercurial globules totally disappear.
It is also prepared with twice the quantity of quicksilver.

Dub.

ke of
Purified quicksilver,
Sublimed sulphur, equal weights.
iturate them together into a stoneware mortar until the
globules disappear.

IT was formerly imagined, that the quicksilver was mere-
mechanically divided, and intimately mixed with the sul-
ur. But that they are really chemically united is proved
the insolubility of the compound in nitrous acid. Four-
y is of opinion, that during the trituration, the mercury
orbs oxygen, and is converted into the black oxide, and
t in this state it is slightly combined with the sulphur.
e editors of Gren also suppose it to be in the state of black
de, but that it is combined with hydroguretted sulphur;
l they direct a little water to be added during the tritu-
ion, that by its decomposition it may facilitate the process.
owever seems now ascertained, that the mercury is in its
tallic state, and chemically combined with the sulphur.

According to the experiments of M. Guibourt, mercury
tes with two proportions of sulphur, forming with one (100
rcury + 8.2 sulphur) the black sulphuret, and with two
0 mercury + 16 sulphur) the red sulphuret. If this idea
correct, and it coincides very nearly with the atomic
ghts of their bodies, the officinal preparation must be
echanical mixture of the protosulphuret, with a great ex-
s of sulphur, as it is formed from equal parts of the metal
l sulphur.

The black sulphuret of quicksilver, prepared by trituration, formerly called Æthiops mineral, has a pulverulent form, is insoluble in nitric acid, is totally soluble in solution of potass, and is precipitated unchanged from this solution by acids. It is not altered by exposure to the air; and when heated in an open vessel, it emits sulphurous acid gas acquires a dark violet colour, and, lastly, sublimes in a brilliant red mass, (bisulphuret?) composed of crystalline needles.

The combination of quicksilver with sulphur may be much more speedily effected by the assistance of heat, by pouring the mercury, previously heated, upon the sulphur in a stat of fusion, and stirring them until they cool and form a consistent mass, which may be afterwards powdered. The sulphuret prepared by fusion differs, however, from that prepared by trituration; for it is not soluble in a solution o potass, but is converted by long ebullition in it into the re sulphuret, and it also reddens spontaneously, in course o time, from the action of the air.

Black sulphuret of mercury may be also prepared in th humid way, as it is called, by precipitation, or even by dire solution. According to Berthollet, mercury agitated wit hydrosulphuret of ammonia forms a black sulphuret exactl resembling that prepared by trituration.

Medical use.—As a medicine, black sulphuret of quicksilver possesses no evident effects. It is principally used as a alternative in glandular affections, and in cutaneous disease It has been commonly given in doses of from 5 to 10 grain but even in doses of several drachms, and continued for considerable length of time, it has scarcely produced an sensible effect.

SULPHURETUM HYDRARGYRI RUBRUM. *Dub.*
Red Sulphuret of Quicksilver.

Take of
Quicksilver, purified, forty ounces;
Sublimed sulphur, eight ounces.
Mix the quicksilver with the melted sulphur; and if the mi ture take fire, extinguish it by covering the vessel; aft wards reduce the mass to powder, and sublime it.

Lond.

Take of
Purified quicksilver, by weight, forty ounces;
Sublimed sulphur, eight ounces.

Mix the quicksilver over the fire with the melted sulphur; and as soon as the mass swells up, remove the vessel from the fire, and cover it strongly, to prevent it from catching fire; then powder it and sublime.

In this process each prime of mercury is combined with wo primes of sulphur, and form the bisulphuret, formerly called Cinnabar. The mercury and sulphur on being heated unite with great energy.

MM. Tuckert and Paysse have described, from actual observation, the process followed in the manufactory of M. Brand at Amsterdam, where 48,000 pounds of cinnabar were annually prepared. 150 pounds of sulphur are mixed with 1080 pounds of mercury, and exposed to a moderate heat in a bright iron kettle, one foot deep, and two and a half in diameter. The black sulphuret of mercury, thus produced, is reduced to powder, and put up in earthen pots capable of containing about a quart of water. The subliming apparatus consists of three large coated crucibles, bound with iron, and surmounted with domes of iron, through the top of which the black sulphuret is introduced. These are built into a furnace, n such a manner that two-thirds of each apparatus is exposed to the action of the flame, which circulates freely around them. The fuel made use of is turf, which is found preferable to all others, probably from its affording a steady and moderate heat. The fire is kindled in the evening; and when the crucibles have become red, the pots containing the black sulphuret are emptied successively into them, at first one into each, and afterwards two, three or more, at a time, according to the violence of the inflammation which succeeds. Sometimes the flame rises four, or even six feet above the domes; when its violence is a little abated, the aperture is covered closely up with a lid of iron. In this manner the whole quantity is introduced into the three crucibles in about thirty-four hours. The fire is steadily supported in a proper degree for thirty-six hours, and the sublimation assisted by stirring the matter every quarter of an hour with a triangle of iron, until the whole is sublimed, when the fire is allowed to expire. The colour of the flame changes during the process from a dazzling white to a yellow white, orange yellow, blue and yellow, green, violet, and blue and green. When it acquires a fine sky-blue, or indigo colour, and rises only an inch or two above the aperture, the aperture is closed hermetically, and luted with clay and sand. After the apparatus has cooled, 400 pounds of sublimed red sulphuret of mercury are found in each, so that there is a loss of 30 pounds on the

1230 of materials employed. The process by which cinnabar is converted into vermilion is kept a secret by the Dutch; but M. Paysse discovered, that by keeping some levigated cinnabar in the dark, covered with water, and stirred frequently for a month, it acquires the brilliant colour of Chinese vermilion.

When taken out of the subliming vessels, the red sulphuret of quicksilver is a brilliant crystalline mass, and first acquires its very rich colour when reduced to the form of a fine powder by trituration. It has neither smell nor taste, and is insoluble in water and in alcohol. In close vessels it sublimes entirely unchanged, but requires for this purpose a considerable degree of heat. It is not soluble in any acid, and is decomposed by the nitro-muriatic only, which dissolves the quicksilver, and separates the sulphur. It is not decomposed by boiling it with solutions of the alkalies, but is decomposed by melting it with potass, soda, lime, iron, lead, copper, antimony, and several other metals. It consists of one prime of mercury 25, and two of sulphur $4 = 29$.

Medical use.—Red sulphuret of quicksilver is sometimes used in fumigations against venereal ulcers in the nose, mouth, and throat. By inhaling the fumes produced by throwing half a drachm of it on red-hot iron, a violent salivation has been produced. This effect is by no means owing to the medicine as a sulphuret; for, when set on fire, it is no longer such, but mercury resolved into vapour, and blended with the sulphurous acid gas; in which circumstances, this mineral has very powerful effects.

Mr Pearson, from his experiments on mercurial fumigation, concludes, that where checking the progress of the disease suddenly is an object of great moment, and where the body is covered with ulcers, or large and numerous eruptions, and, in general, to ulcers, fungi, and excrescences, the vapour of mercury is an application of great efficacy and utility; but that it is apt to induce ptyalism rapidly, and great consequent debility; and that, for the purpose of securing the constitution against a relapse, as great a quantity of mercury must be introduced into the system by inunction as if no fumigation had been employed.

CHAP. XII.—LEAD.

ACETAS PLUMBI. *Dub.*
Acetate of Lead.

Take of
Subacetate of lead, called Ceruse, any quantity;
Distilled vinegar, ten times its weight.

Digest in a glass vessel, until the vinegar become sweet. Having poured this off, add more vinegar, until it cease to become sweet. Filter the liquor, and crystallize by alternate slow evaporation and refrigeration. The crystals are to be dried in the shade.

ACETAS PLUMBI, olim SACCHARUM SATURNI. *Ed.*
Acetate of Lead, formerly *Sugar of Lead.*

Take of
White oxide of lead, any quantity;
Distilled acetic acid, a sufficient quantity.

Pour upon the oxide, put into a cucurbit, ten times its weight of acid.

Let the mixture stand upon warm sand till the acid becomes sweet, which is then to be poured off, and fresh acid added until it cease to become sweet; then evaporate all the liquor, defæcated, in a glass vessel, to the consistence of thin honey, and set it aside in a cold place, that crystals may be formed, which are to be dried in the shade. The remaining liquor is again to be evaporated, that new crystals may be formed; and the evaporation is to be repeated until no more crystals concrete.

PLUMBI ACETAS. *Lond.*
Superacetate of Lead.

Take of
Subcarbonate of lead, one pound;
Stronger acetic acid, one gallon;
Boiling distilled water, a gallon and a half.

Mix the acid with the water; gradually add to the mixture the subcarbonate of lead, and boil until the acid be saturated; then filter through paper; and after evaporation till a pellicle be formed, set it aside to crystallize. Pour off the liquid, and dry the crystals on blotting paper.

The acetate of lead is never prepared by the apothecary, as he can procure it in great perfection at an infinitely cheaper rate from those who manufacture it in large quantities. The preparation of it, as directed by the colleges, is a case of simple solution. The process frequently fails, from the white lead employed being adulterated with chalk or some other earthy substance; but Mr Phillips says that litharge is commonly employed by the manufacturers of sugar of lead. The pyrolignic acid should be employed; for, with an impure acid, the product of pure salt is small, and the quantity of mother-water is increased. The addition of a small quantity of alcohol to the solution, after it has been duly evaporated, is said to improve the beauty of the crystals. The mother-water (which probably is essentially the same with Goulard's extract of lead) may also be made to furnish pure crystals, by adding to it a fresh portion of acetic acid; for, without that precaution, it furnishes only a very heavy, yellow, pulverulent mass.

The manufacture of acetate of lead is conducted more economically when the oxide is dissolved in the acid at the same time that it is prepared, which is done by alternately exposing plates of lead to the vapour of acetic acid, and immersing the plates, thus covered with oxide, into the acid itself.

Acetate of lead has a sweet styptic taste. It has a white colour, and crystallizes in flat parallelopipeds, terminated by a wedge, or more commonly in shining needles. It is soluble in pure water and in alcohol; deaquesces slightly in the air, and is decomposed by heat and light. It is decomposed by the alkalies, by most of the earths and acids, and partially even by water containing carbonic acid. It is blackened by sulphuretted hydrogen.

Crystallized acetate of lead consists of 1 prime protoxide of lead 14, one prime acetic acid 6.25, and 3 primes water $3.375 = 23.625$.

Pharm. use.—It forms an excellent cooling ointment or cerate. It is decomposed for the production of acetic acid, and by double affinity for making acetate of zinc.

Medical use.—The internal use of acetate of lead is to be resorted to only under urgent circumstances, and with great caution. Yet it is remarkable, that when large quantities have been taken at once by accident, no bad consequences have followed. The effects of its gradual introduction with food are well known, and must warn us from continuing its internal exhibition for any length of time. Its use has been revived in Paris in pulmonary hæmorrhage and in dysenery, often combined with opium. The dose is half a grain or a grain every two or three hours till it succeed, or its continuance become unsafe. It forms, however, a very valuable external application in superficial and phlegmonic inflammations, bruises, and diseases of the skin. It is always applied in solution, either simply, or by means of cloths soaked in it, or mixed with bread-crumb. A drachm, with five ounces of any distilled water, forms a strong solution, and with ten ounces of water, a weak solution. If common water be used, the addition of about a drachm of acetic acid will be necessary to keep the lead in solution.

LIQUOR SUBACETATIS LITHARGYRI. *Dub.*
Solution of Subacetate of Litharge.

Take of
  Litharge, one pound;
  Distilled vinegar, eight pints.

Boil to six pints in a glass vessel, with continual agitation; pour off the liquor after the fæces have subsided, and strain it.

LIQUOR PLUMBI SUBACETATIS. *Lond.*
Solution of Subacetate of Lead.

Take of
  Semivitrified oxide of lead, two pounds;
  Dilute acetic acid, one gallon.

Mix and boil to six pints, constantly stirring, then set it aside until the fæces have subsided, and strain.

THE difference of the proportions used by the two colleges is striking; the London College using twice as much lead as the Dublin; and Mr Phillips asserts, a gallon of distilled vinegar, sp. gr. 1.007, will dissolve only ten of the twenty-four ounces ordered by London, and the bulky residuum retains much of the solution. Its colour varies according to the acid used. Made with pyrolignic acid, it is almost colourless; with good distilled vinegar, it is of a straw colour, with a slight admixture of green, and has a sp. gr. of 1.22; and it is a dense solution of a deep brown colour, when the acid which remains after the distillation of vinegar is employed.

Scheele shewed that a solution of sugar of lead was converted into Goulard, by allowing it to act for a day on a plate of lead; and Dr Bostock ascertained it to be the saturated solution of a salt, consisting of one prime acetic acid 6.25, and two primes of protoxide of lead 28=35.25; or a subacetate of lead.

Medical use.—Goulard is only used externally, and diluted, and by many is preferred as a lotion to the solution of acetate of lead. It is in some respects preferable, as in the perfect saturation of the acid, and its want of tendency to crystallize, which is sometimes troublesome, with sugar of lead; but it has the inconvenience of being decomposed by many more substances.

LIQUOR SUBACETATIS LITHARGYRI COMPOSITUS. *Dub.*
Compound Solution of Subacetate of Litharge.

Take of
Liquor of subacetate of litharge, two drachms by weight;
Distilled water, two pints;
Weaker spirit of wine, two drachms by measure.
Mix the spirit and liquor of acetate of litharge, then add the distilled water.

LIQUOR PLUMBI SUBACETATIS DILUTUS. *Lond.*
Diluted Solution of Subacetate of Lead.

Take of
Solution of subacetate of lead, one fluidrachm;
Distilled water, one pint;
Proof-spirit, one fluidrachm.
Mix.

It is convenient to have an officinal dilution ready for use. The spirit of wine is probably added to retard spontaneous decomposition without rendering it too stimulant; but the proportion appears to be small.

CHAP. XIII.—TIN.

STANNI PULVIS. *Dub.*
Powder of Tin.

Take of
Tin, any quantity.
Having melted it over the fire in an iron mortar, agitate it until it be reduced to powder, which is to be passed, when cold, through a sieve.

TIN is easily granulated by pouring it when melted into a box, having its inside well rubbed with chalk, and agitaing it till it congeal. The chalk is then washed away, and he fine powder separated by sifting.

Med. use.—It is occasionally employed as a remedy against vorms, particularly the tænia. The general dose is from a cruple to a drachm. Dr Alston says, its success in tænia hiefly depends on its being given in much larger quantities. He directs an ounce of the powder to be taken on an empty tomach, mixed with four ounces of molasses; next day, alf an ounce; and the day following, half an ounce more; fter which a cathartic is administered. He says, the worms re usually voided during the operation of the purge, but hat the pains of the stomach occasioned by them are removed almost immediately upon taking the first dose of the tin.

CHAP. XIV.—ZINC.

OXYDUM ZINCI. *Ed.*

Oxyde of Zinc.

Let a large crucible be placed in a furnace filled with live coals, so as to be somewhat inclined towards its mouth; and when the bottom of the crucible is moderately red, throw into it a bit of zinc, about a drachm in weight. The zinc soon inflames, and is, at the same time, converted into white flakes, which are to be from time to time removed from the surface of the metal with an iron spatula, that the combustion may be more complete; and at last, when the zinc ceases to flame, the oxide of zinc is to be taken out of the crucible. Having then put in another piece of zinc, the operation is to be repeated, and may be repeated as often as is necessary. Lastly, the oxide of zinc is to be prepared in the same way as the carbonate of zinc.

Dub.

Take of

Zinc, broken into pieces, any quantity.

Throw it at different times into a sufficiently deep crucible, heated red hot, and placed with its mouth inclined towards the mouth of the furnace. After each time that any zinc is thrown in, cover the crucible with another inverted over it, but loosely, so that the air may have access to the zinc. Preserve the white and very light sublimed powder for use.

Lond.

Take of

Sulphate of zinc, one pound;
Liquor of ammonia one pint, or what may be required;
Distilled water, one pint.

Dissolve the sulphate of zinc in the water, and add of the liquor of ammonia what may be required to precipitate the whole oxide of zinc. Having decanted the supernatant fluid, wash the precipitate repeatedly with distilled water, and dry it completely in a sand-bath.

The former of these two processes is an instance of simple oxidizement. At a red heat, zinc attracts the oxygen of the atmosphere so strongly, that it is quickly covered with a crust of white oxide, which prevents the air from acting on the metal below; and therefore we are desired to operate only on small pieces at a time, and to place the crucible so that we may easily take out the oxide formed, and introduce fresh pieces of zinc. As soon as the crust of oxide is broken, or removed, the zinc inflames, and burns with a brilliant white, or greenish blue flame, being at the same time converted into very light flocculi. To save these as much as possible, we are directed to use a very deep and large crucible, and to cover it with an inverted crucible. But as we must not cover it so as to prevent the access of the air, it is doubtful whether the latter precaution be of much service. The greater part of the zinc is, however, oxidized in the crucible, without being previously converted into vapour; and as this portion of the oxide is always mixed with particles of zinc, it is necessary to separate them by trituration and elutriation.

In the process of the London College, the ammonia unites with the sulphuric acid, and the pure oxide of zinc is precipitated in the form of a very fine white powder. I have not repeated the London process carefully, but Mr Phillips remarks, that the quantity of water prescribed is insufficient to dissolve the sulphate of zinc, unless at a boiling heat, which is attended with inconvenience, and that the oxide is readily dissolved by excess of ammonia. Mr Phillips had previously recommended the precipitation by subcarbonate of potass, which gave a subcarbonate of zinc.

The protoxide of zinc is of a pure white colour, without smell or taste, infusible and fixed in the fire, insoluble in water or alcohol, and entirely soluble in most of the acids. The presence of lead in it is detected by sulphuric acid, which forms, in that case, an insoluble sulphate of lead. The protoxide of zinc contains 4.25 zinc and 1. oxygen = 5.25.

Pharm. use.—It is formed into an ointment.

Medical use.—White oxide of zinc is applied externally as a detergent and exsiccant remedy. With twice its weight of axunge, it forms an excellent application to deep chops, or excoriated nipples. But, besides being applied externally, it is also used internally. In doses from one to seven or eight grains, it has been much celebrated in the cure of epilepsy, and several spasmodic affections ; and there are sufficient testimonies of its good effects, where tonic remedies in those affections are proper.

CARBONAS ZINCI IMPURUS PRÆPARATUS. *Ed.*
Prepared Impure Carbonate of Zinc.

The impure carbonate of zinc, after being roasted by those who make brass, is to be pulverized in an iron mortar, and levigated on a porphyry stone with a little water, and then put into a capacious vessel and water poured upon it, which, after frequent agitation, is to be poured off while loaded with minute powder. The subtile powder, which subsides on allowing the water to stand at rest, is to be dried.

LAPIS CALAMINARIS PRÆPARATUS. *Dub.*
Prepared Calamine.

Reduce calcined calamine to powder, and separate the impalpable parts in the same manner that is directed in the preparation of chalk.

CALAMINA PRÆPARATA. *Lond.*
Prepared Calamine.

Burn the calamine ; then triturate it ; lastly, reduce it to an impalpable powder, in the manner directed for the preparation of chalk.

As this preparation of zinc is intended for external application, and often to very tender surfaces, too much pains cannot be bestowed in reducing it to an impalpable powder.

Pharm. use.—It forms one of the most useful of our cerates.

Med. use.—It is sprinkled dry upon intertrigo, excoriations, and ichorous ulcers.

OXIDUM ZINCI IMPURUM PRÆPARATUM. *Ed.*
Prepared Impure Oxide of Zinc.

It is prepared as the impure carbonate of zinc.

THIS oxide is also prepared for external use only.

Pharm. use.—It is the principal ingredient of an officinal ointment.

Med. use.—It is a common application to the intertrigo of infants, dusted dry on the part through muslin.

SULPHAS ZINCI. *Ed.*
Sulphate of Zinc.

Take of
Zinc, cut into small pieces, three parts;
Sulphuric acid, five parts;
Water, twenty parts.

Mix them, and when the effervescence is finished, digest the mixture, for a little, on hot sand; then strain the decanted liquor through paper, and, after proper evaporation, set it apart, that it may crystallize.

Dub.

Take of
Zinc, reduced to powder, in the manner directed for the powder of tin, three ounces;
Sulphuric acid, five ounces;
Water, one pint.

Put the zinc in a glass vessel, and gradually pour on it the acid previously diluted with water. When the effervescence has ceased, digest a little; and, after due evaporation of the filtered liquor, set it aside to crystallize.

Lond.

Take of
Zinc, broken into bits, four ounces;
Sulphuric acid, six ounces, by weight;
Water, four pints.

Mix in a glass vessel; and after the effervescence has ceased, strain the solution through paper, then evaporate to a pellicle, and set it aside to crystallize.

SULPHATE of zinc is chiefly found native in the mines of Goslar, sometimes in transparent pieces, but more commonly in the form of a white efflorescence, which is dissolved in water, and afterwards reduced, by evaporation and crystallization, into large masses. But the sulphate of zinc of commerce is never pure, always containing iron, cadmium, copper, and a little lead. From the mode of its preparation, there is also a deficiency of acid and water of crystallization. A pure sulphate of zinc may be prepared according to the direction of the colleges, in which the zinc is oxidized by the decomposition of the water, and dissolved in the acid, and hydrogen gas is evolved; but we believe this process is very rarely practised, especially as the common sulphate of zinc may be sufficiently purified by exposing it in solution to the air, by which means red oxide of iron is precipitated, and by digesting it upon pure zinc, which precipitates the other metals.

Sulphate of zinc crystallizes in tetrahedral prisms, terminated by pyramids. It has a metallic styptic taste; effloresces slowly when exposed to the air. It is soluble in 2.5 parts of water at 60°, and in much less boiling water. It is not soluble in alcohol. It is decomposed by the alkalies, earths, and hydrosulphurets. It consists of 5.25 oxide of zinc, 5 acid, and 7.875 water of crystallization = 18.125.

Pharm. use.—It is an ingredient in the compound solution of alum. Pure oxide of zinc is prepared from it by precipitation, and it is decomposed by double affinity to form the acetate of zinc.

Med. use.—Sulphate of zinc, in doses from ten grains to half a drachm, operates almost instantly as an emetic, and is at the same time perfectly safe. It is therefore given when immediate vomiting is required, as in cases where poison has been swallowed. By employing it internally, in smaller doses, it acts as a tonic; and some think it, in every case, preferable to the oxide of zinc.

Externally, it is used as a styptic application, to stop hæmorrhagies, diminish increased discharges, as gonorrhœa, and to cure external inflammations, arising from debility and relaxation of the blood-vessels, as in some cases of ophthalmia. It is often prescribed in injections and collyria.

SOLUTIO SULPHATIS ZINCI. *Ed.*
Solution of Sulphate of Zinc.

Take of
  Sulphate of zinc, sixteen grains;
  Water, eight ounces;
  Diluted sulphuric acid, sixteen drops.

Dissolve the sulphate of zinc in the water; then, having added the acid, filter through paper.

THE acid is here added to dissolve the excess of oxide of zinc, which the common sulphate often contains. This solution is of a strength proper for injecting into the urethra, in gonorrhœa, or applying to the eyes in chronic ophthalmia.

LIQUOR ALUMINIS COMPOSITUS. *Lond.*
Compound Solution of Alum.

Take of
  Alum,
  Sulphate of zinc, of each half an ounce;
  Boiling water, two pints.
Dissolve the alum and sulphate of zinc together in the water, and filter through paper.

THIS water was long known in our shops under the title of *Aqua aluminosa Bateana.*

It is used for cleansing and healing ulcers and wounds, and for removing cutaneous eruptions, the part being bathed with it hot three or four times a-day. It is sometimes likewise employed as a collyrium, and as an injection in gonorrhœa and fluor albus.

SOLUTIO ACETATIS ZINCI. *Ed.*
Solution of Acetate of Zinc.

Take of
  Sulphate of zinc, one drachm;
  Acetate of lead, four scruples;
  Distilled water, twenty ounces.
Dissolve each of the salts separately in ten ounces of water. Mix the solutions; and after the impurities have subsided, filter the liquor.

TINCTURA ACETATIS ZINCI. *Dub.*
Tincture of Acetate of Zinc.

Take of
  Sulphate of zinc,
  Acetate of kali, each one ounce.
Triturate them together, and add one pint of rectified spirit of wine.
Macerate for a week, with occasional agitation, and strain through paper.

THESE are both cases of double elective attraction. In the Edinburgh formula, the lead combines, and forms an insoluble compound with the sulphuric acid, while the zinc unites with the acetic acid, and remains in solution.

When crystallized acetate of lead and sulphate of zinc are triturated together, the mixture presently becomes moist, which is owing to the new compounds retaining less water of crystallization than the original salts.

Acetate of lead contains in its crystals 3 primes of water of crystallization, and sulphate of zinc 7; but sulphate of lead contains none, and acetate of zinc 7, consequently 3 are set free.

In the Dublin process acetate of zinc and sulphate of potass are formed, and they are separated by using rectified spirits as the solvent, which dissolves the acetate of zinc, and leaves the sulphate of potass.

The acetate of zinc may be obtained by evaporation, in talcy crystals. It is soluble in water, and is decomposed by heat. It is not poisonous.

Med. use.—The solution of acetate of zinc is, with many practitioners, deservedly much esteemed as an astringent collyrium and injection. The solution in spirit of wine of the Dublin College is stronger and more stimulant than that in water of the Edinburgh.

CHAP. XV.

ALCOHOL, ETHER, AND ETHEREAL SPIRITS.

ALCOHOL. *Lond.*
Alcohol.

Take of

Rectified spirit of wine, one gallon;
Subcarbonate of potass, three pounds.

Put one pound of the subcarbonate, previously heated to 300° Fahr. into the spirit, and macerate for twenty-four hours, frequently stirring them; then decant the spirit, and add the remainder of the subcarbonate of potass heated to the same degree; and, lastly, distil off, in a water-bath, the alcohol, which is to be kept in a well-corked bottle.

The specific gravity of alcohol is to that of distilled water as 815 to 1000.

Dub.

Take of

Rectified spirit of wine, one gallon;
Pearl ashes, dried at 300° Fahr. and still warm, one pound;
Caustic kali, in powder, one ounce;
Muriate of lime dried, half a pound.

Mix the spirit and kali; add the pearl-ashes, previously reduced to powder, and digest the mixture for three days, in a close vessel, frequently agitating it; then pour off the spirit, mix with it the muriate of lime, and distil with a moderate heat, until the residuum begins to grow thick.

The specific gravity of this spirit is to that of distilled water as 815 to 1000.

The muriate of lime may be conveniently obtained from the residuum left in the preparation of water of caustic ammonia.

The Edinburgh College give no directions for the preparation of a very strong alcohol, as it is never used in pharmacy; but it is perhaps to be regretted that they have given the title of alcohol to a liquid which is not the alcohol of chemists, although in their last edition they add epithets to characterize its state.

The affinity of alcohol for water is so very strong, that it cannot be obtained entirely free from it by simple distillation. We must therefore abstract the water by means of some substance which has a stronger affinity for it than alcohol has.

The London College use subcarbonate of potass. When a certain portion of this salt is mixed with rectified spirit, it attracts the water, and being insoluble in alcohol, the deaquated alcohol swims over the alkaline solution: this is decanted off, and a second quantity of salt of tartar added, which attracts more water, but not enough to dissolve it, and it now remains as a granulated salt with still stronger spirit floating over it. The spirit now contains no alkali, and turmeric paper is not affected by it; but to separate it entirely distillation is employed. The salt of tartar may be recovered by evaporation, and perfectly pure.

The process of the Dublin College is more complicated. They first dissolve some caustic potass in it, but no separation takes place. Next they use subcarbonate of potass, but in less quantity than the London College. The decanted spirit contains the potass in solution. When they add this to the muriate of lime, lime is precipitated, and muriate of potass formed, which retains the water when the spirit is distilled off. In this complicated process I think the potass not only useless, but injurious. The muriate of lime is however preferable as a second deaquating addition to the salt of tartar; because it is soluble in alcohol, and therefore comes in contact with every particle of water in the spirit. By distillation, if not continued too long, the alcohol rises, while the water is retained by the salt.

Spirits may be very much strengthened by using a series of condensers, and keeping those near the still at a pretty high temperature, by which contrivance great part of the aqueous vapour, with little spirit, is condensed in them, while the strong spirit passes over to be condensed in the most remote receiver, which must be kept very cold.

Pharm. use.—Neither pure or absolute alcohol of sp. gr. 796, nor even that of the Colleges 815, is used in officinal pharmacy, but it is a valuable instrument of analysis.

Med. use.—Pure alcohol is not used in medicine, but it is an extremely pungent stimulus; and when prevented from evaporating, which it does rapidly with the production of intense cold, it inflames and blisters the part to which it is applied. Taken internally its effects on an empty stomach, if taken undiluted and in even a small quantity, might prove fatal. In other circumstances its effects would coincide with those of rectified spirits.

ÆTHER SULPHURICUS. *Ed.*
Sulphuric Ether.

Take of
  Sulphuric acid,
  Stronger alcohol, each thirty-two ounces.

Pour the alcohol into a glass retort, capable of sustaining a sudden heat, and add to it the acid, in an uninterrupted stream. Mix them by degrees, shaking them gently and frequently, and instantly distil from sand, previously heated for the purpose, into a receiver kept cool with water or snow. The heat must also be so managed, that the liquor shall boil as soon as possible, and continue to boil till sixteen ounces are drawn off, when the retort is to be removed from the sand.

To the distilled liquor add two drachms of potass, and distil from a very high retort, with a very gentle heat, into a cool receiver, until ten ounces have been drawn off.

If sixteen ounces of stronger alcohol be poured upon the acid remaining in the retort after the first distillation, and the distillation be repeated, more Ether will be obtained; and this may be repeated several times.

Dub.

Take of

Sulphuric ethereal liquor, twenty ounces, by measure;
Subcarbonate of kali, dried and powdered, two drachms.

Mix them, and distil, with a very gentle heat, twelve ounces, by measure, from a very high retort into a cooled receiver.

Its specific gravity is 765, water being 1000.

Lond.

Take of

Rectified spirit,
Sulphuric acid, of each one pound and a half.

Put the spirit into a glass retort, and gradually add to it the acid, shaking them frequently, and taking care that the temperature, during the mixture, do not exceed 120° Fahr.

Then cautiously place the retort in a sand-bath, previously heated to 200°, so that the liquor may boil as quickly as possible, and the *Ether* may be distilled over into a tubulated receiver, to which a vessel, cooled with snow or ice, is fitted. Continue the distillation until a heavier fluid begin to come over, which is seen in the bottom of the receiver, below the ether.

Pour twelve ounces more of rectified spirit upon the liquor remaining in the retort, and repeat the distillation of ether in the same manner.

ÆTHER RECTIFICATUS. *Lond.*

Rectified Ether.

Take of

Sulphuric ether, fourteen fluidounces;
Fused potass, half an ounce;
Distilled water, eleven fluidounces.

Dissolve the potass first in the two fluidounces of the water, and add the ether to it, shaking them constantly until they are mixed. Then with a heat of about 120°, distil from a large retort into a cold receiver, twelve fluidounces of rectified ether. Mix the distilled liquor with eleven ounces of the water, and let it settle. Then decant the supernatant ether, and keep it in a well-corked bottle.

ÆTHER SULPHURICUS CUM ALCOHOLE. *Ed.*

Sulphuric Ether with Alcohol.

Take of

Sulphuric ether, one part;

Stronger alcohol, two parts.
Mix them.

SPIRITUS ÆTHERIS SULPHURICI. *Lond.*
Spirit of Sulphuric Ether.

Take of
Sulphuric ether, half a pint;
Rectified spirit, a pint.
Mix them.

LIQUOR ÆTHEREUS SULPHURICUS. *Dub.*
Sulphuric Ethereal Liquor.

Take of
Rectified spirit of wine,
Sulphuric acid, each thirty-two ounces, by weight.

Put the spirit heated to 120° into a glass retort capable of supporting a sudden heat, and pour upon it the acid, in a continued stream. Mix them gradually, and distil into a cooled receiver twenty ounces of liquor, by measure, with a sufficient and quick heat.

If sixteen ounces of rectified spirit of wine be poured upon the acid residuum in the retort, it will again afford, by distillation, sulphuric ethereal liquor.

THE products rising from the decomposition of alcohol by the action of the acids are extremely curious and interesting. The first step to the true theory of etherification was made by Fourcroy and Vauquelin, and Gay-Lussac has completed it. To understand it, we must recapitulate the composition of alcohol, and contrast it with that of ether, in regard to the volumes of the gases of which they are composed.

	Volume.		Olef. gas.		Aq. vapour.	Sp. gr. calc.	By expt.
Alcohol vapour	1	=	1	+	1	1.599	1.613
Ether vapour	1	=	2	+	1	2.5694	2.581

We thus see that the difference between the vapour of alcohol and of ether is, that in the latter two volumes of olefiant gas are united with one of aqueous vapour, and in the former one, and that the volume of the aqueous vapour is not altered by its combination with either one or two volumes of olefiant gas. The calculated sp. gr. correspond as nearly with the experimentals as can be expected in such inquiries,

Comparing the weight of their elementary atoms, we find a similar coincidence.

	Atoms or Primes.					Weight.						
	Oxyg.		Hyd.		Carb.	Oxyg.		Hyd.		Carb.		
Alcohol	1	+	3	+	2	1	+	0.375	+	1.5	=	2.875
Ether	1	+	5	+	4	1	+	0.625	+	3.	=	4.625

Or, in other terms, alcohol consists of one prime of water and two primes of carburetted hydrogen, and ether of one and four primes of the same ingredients. To convert alcohol into ether, it is therefore necessary to combine it with two additional primes of carburetted hydrogen, or, what is the same thing, to deprive two primes of alcohol of one prime of water, and this is the mode in which sulphuric acid acts. In consequence of its strong affinity for water, the alcohol undergoes partial decomposition, and part of its oxygen and hydrogen unites to form water to satisfy the affinity of the acid.

The most convenient way of mixing the ingredients is to put the alcohol, previously heated, into a tubulated retort, and with a long-tubed funnel, reaching down to the bottom of the retort, to pour in the acid. By cautious agitation, the two fluids unite, and heat is produced, which may be taken advantage of in the distillation, if we have a sand-bath previously heated to 200°, to receive the retort. The receiver is to be immediately connected with the retort, and the junction closed with linseed meal lute, covered with wet bladders. A tubulated receiver, with a bent tube dipping into mercury, is preferable; but an ordinary receiver will do, if it be large, and immersed in very cold water, or covered with crushed ice.

Immediately on mixing the acid with the alcohol, there is a considerable increase of temperature, and a slight disengagement of alcohol, somewhat altered, and having an aromatic odour. On placing the retort in the sand bath, a portion of pure alcohol first comes over; and when the mixture in the retort boils, the ether rises, and is condensed in thin, broad, straight streaks, having the appearance of oil.

The distillation is directed to be performed with an equal and very gentle, but quick heat. Mr Brande informs us, that with a temperature of 212°, and even 220°, very little else than alcohol comes over, and that from 250 to 280 is necessary for the generation of ether; while Mr Phillips says, that when the distillation of 10 ounces of product was completed in three hours, its sp. gr. was 0.791; but when it occupied almost nine hours, its sp. gr. was only 0.782. Until the liquor which passes over into the receiver amounts to about half, or somewhat more than half, of the alcohol operated on, it consists almost entirely of alcohol and ether, and there has been no disengagement of any permanently elastic fluid; but now the production of ether ceases, and sulphureous vapours begin to arise, which condense in irregular streaks, or in drops, and is the heavier fluid seen below the ether: we must therefore either put a stop to the process, or change the receiver.

Mr Phillips has ascertained the sp. gr. of the products at different periods of the distillation. From 16 oz. of acid sp. gr. 1.837, and an equal weight of spirit sp. gr. 0.830, he got 12 ounces of product; 4 of ethereal spirit of sp. gr. 0.779; 4 more of sp. gr. 0.753; then 2½ of yellow sulphureous spirit of sp. gr. 784; and lastly, 1½ of heavy fluid of 0.981.

The decomposition of the alcohol seems to be the reason why ether ceases to be produced; for if, as the colleges direct, half the original quantity of alcohol be added, more ether is produced. At the same time, it would appear, that the power of the acid to form ether is diminished, for the second product is heavier than the first.

Mr Phillips, from a pound and a half each of acid and of rectified spirit got floz. 12 product, of which flodr. 6 were the heavier fluid indicated, and floz. 11.26 of ether, specific gravity 0.768; and by a second distillation, after 12 ounces more of spirit were added to the residuum, he got about the same quantity of ethereal product, of 0.807.

The process is more advantageous upon a large scale. At Apothecaries Hall, as Mr Brande informs us, 100 lb. sulphuric acid and 100 rectified spirit afford lbs. 52 ether of sp. gr. .761; and 50 lbs. spirit added to the residuum furnish lbs. 46—52, of ether .765. The lbs. 100 of impure ether thus obtained, afford by rectification, from lbs. 55—58 of rectified ether of .733.

At Apothecaries Hall, the still is of cast iron lined with lead, and heated by high pressure steam, passing through a contorted pipe at the bottom of the still, by which the mixture is very rapidly raised to its boiling point, a larger product obtained, and all danger avoided, as the steam boiler is in another apartment.

The ether may be rectified or separated from the alcohol, water, and sulphureous acid, with which it is always mixed, by re-distilling it with a very gentle heat, after mixing it with potass, which combines with the acid, water, and alcohol. The alkali ought to be added in substance according to the directions of the Edinburgh College, not in solution as prescribed by that of London. In practice, subcarbonate of potass is used for the rectification of ether, from which it is re-distilled, as long as it is of sufficient strength.

For medicinal purposes, ether of 730–740 will serve, but it should not exceed 750. It is said to have been procured as low as 632, but Mr Brande could not get it lower than 700. When pure, sulphuric ether is a transparent colourless fluid, of a very fragrant odour, and hot pungent taste: It freezes and crystallizes at —46°. It boils at 98°, and in vacuum at —20°. It is very soluble in air, and during its evaporation it produces an intense degree of cold. It is soluble in ten parts of water, and in alcohol in every proportion. It dissolves a small portion of phosphorus, and the solution is decomposed by alcohol. It absorbs nitrous gas, combines with ammonia, and dissolves the volatile oils, resins, and caoutchouc. Ether is extremely inflammable, and burns with a white flame. Its vapour explodes when kindled in contact with oxygen gas. It is decomposed by sulphuric acid, chlorine, and by being transmitted through a red-hot porcelain tube.

Medical use.—Ether taken internally is an excellent antispasmodic, cordial, and stimulant. In catarrhal and asthmatic complaints, its vapour is inhaled with advantage, by holding in the mouth a piece of sugar on which ether has been dropt. It is given as a cordial in nausea, and in febrile diseases of the typhoid type; as an antispasmodic in hysteria, and in other nervous and painful diseases; and as a stimulus in soporose and apoplectic affections. Regular practitioners most frequently give only a few drops for a dose; but empirics have sometimes ventured upon much larger quantities, and with incredible benefit. When applied externally, it is capable of producing two very opposite effects, according to its management; for, if it be prevented from evaporating, by covering the place to which it is applied, closely with the hand, it proves a powerful stimulant and rubefacient, and excites a sensation of burning heat. In this way it is frequently used for removing pains in the head or teeth. On the contrary, if it be dropt on any part of the body, exposed freely to the contact of the air, its rapid evaporation produces an intense degree of cold; and as this is attended with a proportional diminution of bulk in the part to which it is applied, in this way it has frequently facilitated the reduction of strangulated hernia.

The mixture of ether with alcohol, whether prepared directly by mixing them as the Edinburgh College direct, or in the impure state in which it comes over in the first part of the process for distilling ether, possesses similar virtues with ether, but in an inferior degree.

OLEUM ÆTHEREUM. *Lond.*
Ethereal Oil.

After the distillation of sulphuric ether, continue the distillation with a reduced heat, until a black froth swell up. Immediately remove the retort from the fire, and pour water upon the liquor which remains in the retort, that the oily matter may float. Skim off the oily matter, and mix it with as much lime-water as will saturate the acid in it. Shake them together; and, lastly, collect the ethereal oil after it has separated.

SPIRITUS ÆTHERIS SULPHURICI COMPOSITUS. *Lond.*
Compound Spirit of Sulphuric Ether.

Take of
Spirit of sulphuric ether, one pint;
Ethereal oil, two fluidrachms.
Mix them.

LIQUOR ÆTHEREUS OLEOSUS. *Dub.*
Oily Ethereal Liquor.

Take what remains in the retort after the distillation of the vitriolic ether.
Distil to one half, with a moderate heat.

IF we continue the distillation after the ether is no longer furnished unmixed, the residuum in the retort begins to blacken, and the products are sulphureous acid, acetic acid, water, and oil of wine, accompanied towards the end by olefiant gas. At last the matter in the retort, which has now become thick and black, swells up, and prevents us from carrying the process further.

Mr Phillips says, that he has not been able to prepare, nor even to purchase the ethereal liquor. What he prepared was ether mixed with sulphurous acid; and what he purchased was empyreumatic ether, containing neither oil nor sulphurous acid. But Mr Brande asserts, that by following the directions of the colleges, a very small portion of pure ethereal oil may be obtained, and that it may be procured in larger quantities by distilling equal measures of rectified spirit and sulphuric acid. It is best purified by washing it with weak solution of subcarbonate of potass, and he describes its properties. Its sp. gr. is 1.060. It is insoluble in water, but soluble in ether and alcohol. It has a fragrant odour, and an aromatic, bitterish, and pungent taste. In its composition and general characters, it resembles the vegetable essential oils, and he has sometimes observed crystals in it.

The London and Dublin Colleges have a solution of it in spirit of sulphuric ether, but its medical effects have not been ascertained.

ÆTHER NITROSUS. *Dub.*
Nitrous Ether.

Take of

Nitrate of kali, dried, and in coarse powder, one pound and a half;

Sulphuric acid, one pound;

Rectified spirit of wine, nineteen ounces, by measure.

Put the nitrate of kali into a tubulated retort, placed in a bath of cold water, and pour upon it gradually, and in different portions, the sulphuric acid and spirit, previously mixed, and allowed to cool after having been mixed. Without any external heat, or only a very slight degree of it (such as the addition of tepid water to the bath,) an ethereal liquor will begin to arise, without applying fire under it. In a short time, the heat will spontaneously increase in the retort, and a remarkable ebullition will take place, which are to be moderated, by cooling the bath with cold water. The receiver ought also to be cooled with water or snow, and furnished with a proper apparatus for transmitting the very elastic vapour (arising from the mixture, with very great force, if the heat should accidentally become too high) through a pound of rectified spirit of wine, placed in a cooled phial.

Put the ethereal liquor, which has distilled spontaneously, into a phial with a ground glass stopper, and gradually add (closing the phial after each addition) as much very dry subcarbonate of kali in powder, as shall be sufficient to saturate the superabundant acid, according to the test of litmus. This commonly takes place on the addition of about a drachm of the salt; and in a short time, the nitrous ether will swim on the surface, and is to be separated by means of a funnel.

If it be required very pure, re-distil the ether from a water-bath, at about 140°, to one-half.

Its specific gravity is 900.

ALCOHOL can be converted into an ether by nitric acid also; but the chemical action is more complicated, and its theory not so well understood. A great deal depends upon the proportions in which they are mixed, and the emperature applied. From the mixture of three parts of strong nitrous acid, and one of alcohol, there is great increase of heat, red fumes are evolved, and oxalic acid crystallizes in the residuum. In the proportion of equal parts rapidly mixed, the reaction is so accelerated by the heat produced, that the effervescence may be called explosive, and is attended with danger; but if the action be restrained, nitric ether is one of the products. There are various ways of moderating the reaction; 1*st*, by reducing the temperature; 2*dly*, by impeding their mixture; 3*dly*, by not using the acid itself, but generating it gradually in the mixture. Dr Black contrived an ingenious method of rendering their mixture extremely slow, although put at once into the same phial. On two ounces of strong nitrous acid, put into a phial, having a conical ground glass stopper, and a weak spring fitted to keep the stopper in its place, pour slowly and gradually about an equal quantity of water, which, by being made to trickle down the sides of the phial, will float on the surface of the acid, without mixing with it; then add, in the same cautious manner, three ounces of alcohol, which, in its turn, will float on the surface of the water. By this means the three fluids are kept separate, on account of their different specific gravities, and a stratum of water is interposed between the acid and spirit. The phial is now to be set in a cool place, and the acid will gradually ascend, and the spirit descend through the water; this last acting as a boundary to restrain their action on each other. When this commences, bubbles of gas rise through the fluids, and the acid gets a blue colour, which it again loses in the course of a few days, and a yellow nitrous ether begins to swim on the surface. As soon as the formation of air-bubbles ceases, it is time to remove the ether formed; for if allowed to remain, its quantity decreases. By this method, nitrous ether is formed, without the danger of producing any explosion. The residuum of this process is still capable of forming a spirit of nitrous ether, with an additional quantity of alcohol.

By adding the acid to the alcohol in very small quantities at a time, and at considerable intervals, M. Dehne procured from 256 of alcohol, and 211 of nitrous acid, 203 of nitric ether; the residuum weighed 244 ounces: there was therefore a loss of 40. M. Dehne put the alcohol into a tubulated retort, to which a receiver was luted, and poured the acid through the tubulature, and the ether passed over into the receiver, without the application of any heat. The action did not begin until six ounces and a half of the acid were added to the alcohol, and was found to be exhausted, when, on adding more acid, it fell to the bottom in the form of green drops. I have repeatedly prepared nitric ether with great facility and safety by putting alcohol into a tubulated retort having a small long-tubed funnel introduced through a cork in the tubulature, so that the end of the funnel is immersed in the alcohol, and pouring in nitrous acid slowly, until reaction commences, and waiting till it has ceased before more acid be added in successive portions, until the whole proportion intended be added. After the spontaneous action has ceased, heat may be cautiously applied as long as ether is produced. I used a Woulfe's apparatus kept very cold. The first receiver was empty, and in it the greater part of the ether condensed; the second receiver contained water; and the third alcohol, from which a bent tube gave a ready exit for the gases. Thenard uses five connected receivers, all of them containing a saturated solution of sea salt. Without this precaution he found the fluid distilled was very impure, and was a mixture of nitric ether, alcohol, water, nitrous and acetic acids, which must have been partly owing to his not moderating sufficiently the reaction of the acid and alcohol.

The method of forming nitrous ether, now directed by the Dublin College, was first practised by M. Voigt. I have not tried it, but the theory is simple. By the action of the sulphuric acid on the nitre, nitric acid is gradually disengaged, which immediately reacts upon the alcohol, and ether is necessarily formed.

The properties of nitric ether have been detailed by M. Thenard, which coincide with my own observations. It has a pale yellow colour, like a very limpid oil; a strong ethereal smell, and a peculiar pungent taste. It is very volatile, and produces intense cold during its evaporation, and its vapour is much more elastic than that of sulphuric ether. It is very inflammable, and burns with a brilliant white flame. When simply washed with water, I found its sp. gr. to be 0.912; but it evidently contained acid. When this was removed, by saturating it with potass, it became 0.896; and when rectified, by redistillation, it became 0.866, but recovered acid properties. It is soluble in 48 times its weight of water, to which it imparts the odour of apples. It is dissolved in alcohol in every proportion; and the alcohol which I put into the third Woulfe's bottle absorbed what escaped condensation, and was converted into spirit of nitrous ether.

When kept for some time, both nitric and acetic acids were ormed in it.

The only analysis is by Thenard, who found in it 14.49 itrogen, 28.45 carbon, 48.52 oxygen, and 8.54 hydrogen = 100, which does not differ much from 4 primes of carburetted ydrogen, 3 of water, and 1 of deutoxide of azote. If we uppose two of the primes of water to be only hygroscopi-ally mixed, then nitric ether differs from sulphuric only in ontaining a prime of nitric oxide, a constitution of the sub-tance which I conjectured from other observations, especial-y its giving a deep olive colour to solutions of the proto-alts of iron.

The gas, which is evolved in great quantity, has been ound by Thenard to be very complicated, consisting chiefly f protoxide of azote, mixed with deutoxide of azote, azote, arbonic, acetic, and nitrous acids, loaded with ethereal va-our. I found, that after the air of the apparatus had been xpelled, protoxide of azote first came over, and then a mix-ure of carbonic acid, and an etherized gas. When recently repared, this gas is inflammable, and does not form red umes on coming into contact with atmospheric air: but hen attempted to be kept over water, the water becomes cidulous, the gas is diminished in bulk about two-thirds, oses its inflammability, and is now converted into red va-ours on the admission of atmospheric air.

SPIRITUS ÆTHEREUS NITROSUS. *Dub.*
Nitrous Ethereal Spirit.

dd to the matter which remains after the distillation of the nitrous ether, the rectified spirit of wine, which was employed in that operation for condensing the elastic vapours, and distil, with the greatest heat of a water-bath, to dryness. Mix the distilled liquor with the alkaline liquor which remained after the separation of the nitrous ether, and also add as much very dry subcarbonate of kali, as shall be sufficient to saturate the predominant acid, according to the test of litmus. Lastly, distil by the medium heat of a water-bath as long as drops come over.

The specific gravity of this liquor is 850.

SPIRITUS ÆTHERIS NITROSI. *Ed.*
Spirit of Nitrous Ether.

Take of

Stronger alcohol, three pounds;
Nitrous acid, one pound.

Pour the alcohol into a capacious phial, placed in a vessel full of cold water, and add the acid by degrees, constantly agitating them. Let the phial be slightly covered, and placed for seven days in a cool place; then distil the liquor, with the heat of boiling water, into a receiver kept cool with water or snow, till about three pounds come over.

SPIRITUS ÆTHERIS NITRICI. *Lond.*
Spirit of Nitrous Ether.

Take of
- Rectified spirit of wine, two pints;
- Nitric acid, three ounces, by weight.

Pour the acid gradually upon the spirit, and mix them, taking care that the heat do not exceed 120°, and distil with a gentle heat twenty-four fluidounces.

THE process of the Dublin College is only applicable when nitric ether has been prepared, in which case it is economical by converting the various residues to use.

In the processes of the London and Edinburgh Colleges, the spirit of nitrous ether is the principal product. They differ from that for forming nitric ether only in the larger proportion of alcohol employed, which renders it more manageable, and gives a mixed product of nitric ether and alcohol. But the proportion used by the two Colleges is considerably different, Edinburgh ordering only 3 of alcohol to 1 of acid, and London a little more than 8 to 1.

There is no advantage in keeping the materials mixed seven days before proceeding to distillation. If cooled and carefully mixed, I find that no action takes place until heat be applied; and we may immediately proceed to the distillation, which must be performed with a very slow and well-regulated fire, not exceeding 180°, lest a portion of undecomposed acid pass over, and spoil the product.

At Apothecaries Hall an earthen-ware still is used, and it is heated by steam applied to its outer surface.

The Edinburgh College directs the distillation to be continued till about three pounds come over, which is equal to the alcohol operated upon. When from the quantities ordered by the London College only 24 fluidounces are drawn off, a perfectly colourless and very slightly acid product is obtained, of sp. gr. 0.834, but immediately afterwards the spirit becomes coloured and very acid.

By performing this operation carefully in a Woulfe's apparatus, from three ounces of alcohol, specific gravity 0.841, and one ounce of nitrous acid, I got in the receiver two unces four drachms of spirit of nitrous ether, specific graity 0.887. Eight ounces of alcohol, contained in the first hial connected with the receiver, gained one drachm and half, and acquired specific gravity 0.873, and eight ounces f water in the second gained 18 grains: the residuum eighed seven drachms and a half. There was therefore a oss of 2 drachms 42 grains of permanently elastic fluids.

The spirit of nitrous ether, thus obtained, is a colourless luid, of a fragrant odour, lighter than water, extremely voatile and inflammable, possessing properties in general anaogous to the spirit of sulphuric ether, but of considerably reater specific gravity, striking a deep olive, with a solution f green sulphate of iron, and often, if not always acid. By ge and exposure to the air, it is gradually decomposed, and gives rise to the reproduction of nitrous acid. When this hange has taken place, it may be rectified, by saturating the cid with lime-water, and re-distilling the ethereal fluid.

In all probability, spirit of nitrous ether is a mixture of itrous ether and alcohol; for, by diminishing the quantity f alcohol employed, we obtain a fluid having a similar relaion to the spirit of nitrous ether that sulphuric ether has to the spirit of sulphuric ether. By adding alcohol to the residuum of nitrous ether, the Dublin College prepare their spirit of nitrous ether, in the same way as spirit of sulphuric ether is prepared from the residuum of sulphuric ether: and by mixing nitrous ether with alcohol, we obtain a fluid exactly resembling spirit of nitrous ether.

Medical use.—Spirit of nitrous ether has been long deservedly held in great esteem. It quenches thirst, promotes the natural secretions, expels flatulence, and moderately strengthens the stomach. It may be given in doses of from twenty drops to a drachm, in any convenient vehicle. Mixed with a small quantity of spiritus ammoniæ aromaticus, it proves a mild, yet efficacious diaphoretic, and often remarkably diuretic, especially in some febrile cases, where such a salutary evacuation is wanted. A small proportion of this spirit added to malt spirits gives them a flavour approaching to that of French brandy.

CHAP. XVI.

VEGETABILIA. *Lond.*

VEGETABLES.

Vegetables are to be gathered in their native soil and situation, in dry weather, when they are neither wet with showers nor dew; they are to be collected every year, and what are older must be thrown away.

Roots, for the most part, are to be dug up before they shoot up their leaves or stalks.

Barks ought to be gathered when they can be separated most easily from the wood.

Leaves are to be plucked after the flowers have faded, and before the seeds are ripe.

Flowers are to be gathered when just opened.

Seeds are to be collected when ripe, and before they fall, and are to be kept in their proper pericarps.

VEGETABILIUM PRÆPARATIO. *Lond.*
Preparation of Vegetables.

Vegetables, soon after they are gathered, except those which are used fresh, are to be loosely spread out, and dried as quickly as possible, with a heat so low as not to alter the colour. They are then to be preserved from the action of light and moisture in proper situations, or vessels.

Roots, which are directed to be preserved fresh, are to be buried in sand.

VEGETABILIUM EXSICCATIO. *Ed.*
The Drying of Vegetable Substances.

HERBS and flowers are to be dried by the gentle heat of a stove or common fire, in such quantities only at a time, that the process may be finished as quickly as possible; for by this means their powers are best preserved; the test of which is the perfect preservation of their natural colour.

The leaves of hemlock *(conium maculatum)* and of other plants containing a subtile volatile matter, must be reduced to powder immediately, after being dried, and afterwards kept in opaque glass phials well corked.

HERBARUM EXSICCATIO. *Dub.*

The Drying of Herbs.

Put the fresh leaves of the herb, when in flower, into paper bags, and expose them to a low degree of heat for an hour; then spread them lightly upon a sieve, and dry them as quickly as possible, taking care that the green colour be not injured by too great a degree of heat; but if the herbs are to be used in the form of powder, they are to be powdered immediately, and preserved in small opaque phials well corked.

Herbs and flowers, from which waters or oils are to be distilled, should be dried as soon as they are gathered.

THE rules for collecting, drying and preserving simples have been detailed in the first part of this work, at page 19.

PULVIS SCILLÆ. *Dub.*

Powder of Squills.

Cut the squills, after having removed their membranaceous integuments, into transverse slices; dry these on a sieve with a gentle heat, and reduce them to powder, which is to be kept in phials with ground glass-stoppers.

Lond.

The bulb of the squill, before drying it, is to have its arid coats peeled off, and to be cut transversely into thin slices.

Edin.

The root of the sea squill *(scilla maritima,)* after having removed its external coat, is to be previously cut transversely into thin slices. The sign of its being properly dried is, that although rendered friable, it retains its bitterness and acrimony.

THE squill has a very large scaly bulb. The outer scales are of a brown colour, and have become mere membranes, and are peeled off as being inert. The inner scales are thick and fleshy and attenuated at the edges, and are each covered with a very dense cuticle of fine shaded pink, like some conch shells. This cuticle prevents the exhalation of the moisture if the scales be merely separated, and therefore arises the necessity of making transverse sections of the bulb, that the vessels may be divided. The heat applied must be very moderate at first; otherwise, from the great quantity of water it contains, and the nature of its parenchyme, the latter is extremely apt to undergo a species of coction, and if too great heat has been employed in drying it, it becomes almost inert. The bulb loses in this process four-fifths of its original weight; the parts which exhale with a moderate heat appear to be merely watery: hence six grains of the dry root are equivalent to half a drachm of it when fresh. Squill also loses its virtues by long keeping in the state of powder.

Med. use.—Dried squills furnish us with a medicine, sometimes advantageously employed as an emetic, often as an expectorant, and still more frequently as a powerful diuretic.

PULVIS SPONGIÆ USTÆ. *Dub.* SPONGIA USTA. *Lond.*
Powder of Burnt Sponge.

Cut the sponge in pieces, and bruise it, so as to free it from small stones (foreign matters adhering to it, *Lond.*); burn it in a covered iron vessel, until it become black and friable; afterwards reduce it to a very fine powder.

BY burning, sponge is partially decomposed. It loses its water, and the animal principles of which it chiefly consists are decomposed; but the charcoal and saline matters, especially the hydriodates, on which its virtues depend, remain in a state fitter for medical use. The burning or roasting should not be carried farther than what is sufficient to decompose the animal principles, and render the sponge friable. It is known to be good when violet fumes arise from the action upon it of sulphuric acid assisted by heat.

PULVIS QUERCUS MARINÆ. *Dub.*
Powder of Yellow Bladder Wrack.

Take of

Yellow bladder wrack, in fruit, any quantity.

Dry and clean it; then expose it to the fire in an iron pot or crucible, covered with a perforated lid, until, after the vapours cease, the mass becomes of a dull red. Powder the carbonaceous mass which remains.

THIS charcoal was formerly known under the name of *Æthiops Vegetabilis.* It is analogous to the preceding article.

Chap. XVII.

EXPRESSED AND INSPISSATED JUICES.

The juices of succulent plants are obtained by expression, (p. 36). They are of a very compound nature, consisting of the sap, the secreted fluids, and fecula, mixed together. When first prepared, they are very high coloured, turbid, and loaded with parenchymatous matter. They may be purified by rest and deposition, (p. 34,) filtration, (p. 34,) heat and clarification, (p. 38). Rest may be employed with juices, which are very fluid, do not contain volatile matter, and are not susceptible of alteration, and with subacid juices, as that of lemon. By rest these undergo a kind of slight fermentation, and all their mucilaginous and other viscid parts separate. Filtration is perhaps the most perfect means of defecation, but it is tedious, and applicable only to very fluid juices. In many instances it may be facilitated by the addition of water. The action of heat is more expeditious, and is employed for juices which are very alterable, or which contain volatile matter. It is performed by introducing the juice into a matrass, and immersing it in boiling water for some minutes. The albuminous fecula are coagulated, and easily separated by filtration. Clarification by white of egg can only be used for very viscid mucilaginous juices, which contain nothing volatile. The white of two eggs may be allowed to each pint of juice. They are beat to a fine froth, the juice gradually mixed with them, and the whole brought to ebullition. The albumen coagulating envelops all the parenchymatous and feculent matters, and the juice now passes the filter readily. By this process, juices are rendered sufficiently fine; but the heat employed deepens their colour, and manifestly alters them, so that it is not merely a defecating but a decomposing process. When depurated, juices are yellow or red, but never green.

The fluids thus extracted from succulent fruits, whether acid or sweet, from most of the acrid herbs, as scurvy-grass, and water cresses, from the acid herbs, as sorrel and wood-sorrel, from the lactescent plants, as dandelion and hawkweed, and from various other vegetables, contain great part of the peculiar taste and virtues of the respective subjects. The juices, on the other hand, extracted from most of the aromatic herbs, have scarcely any thing of the flavour of the plants, and seem to differ little from decoctions of them made in water boiled till the volatile odorous parts have been dissipated. Many of the odoriferous flowers, as the lily, violet, and hyacinth, not only impart nothing of their fragrance to their expressed juice, but have it totally destroyed by the previous bruising. From want of sufficient attention to these particulars, practitioners have been frequently deceived in the effects of preparations of this class: juice of mint has been often prescribed as a stomachic, though it wants those qualities by which mint itself and its other preparations operate.

There are differences as great in regard to their preserving those virtues, and this independently of the volatility of the active matter, or its disposition to exhale. Even the volatile virtue of scurvy-grass may be preserved almost entire in its juice for a considerable time; while the active principle of the juice of the wild cucumber quickly separates and settles to the bottom, leaving the fluid part inert. Juices of arum root, iris root, bryony root, and other vegetables, in like manner, allow their nutritious parts to settle at the bottom, while their acrimony remains in the fluid.

If juices are intended to be kept for any length of time, about one-fortieth part of their weight of good spirit of wine may be added, and the whole suffered to stand as before: a fresh sediment will now be deposited, from which the liquor is to be poured off, strained again, and put into small bottles which have been washed with spirit and dried. A little oil is to be poured on the surface, so as very nearly to fill the bottles, and the mouths closed with leather, paper, or stopped with straw, as the flasks are in which Florence oil is brought to us: this serves to keep out dust, and suffers the air to escape, which, in process of time, arises from all vegetable liquors, and which would otherwise endanger the bursting of the glasses; or, being imbibed afresh, render their contents vapid and foul. The bottles are to be kept on the bottom of a good cellar or vault, placed up to the necks in sand. By this method some juices may be preserved for a year or two; and others for a much longer time, though whatever care be taken, they are found to answer better when fresh; and from the difficulty of preserving them, they have of late been very much laid aside, especially since we have been provided with more convenient and useful remedies. Expressed juices are no longer officinal in Britain, but may be ordered extemporaneously. They may be taken in doses from an ounce or two to a quarter of a pint, two or three times a-day: they generally increase the urinary secretion, and sometimes induce a laxative habit.

Succi spissati. *Ed.*
Inspissated Juices.

Bruise the fresh substance, and, including it in a hempen bag, compress it strongly till it yield its juice, which is to be evaporated in shallow vessels heated in boiling water, saturated with muriate of soda, and immediately reduced to the consistence of thick honey.

After the mass has become cold, it is to be put up in glazed earthen vessels, and moistened with alcohol.

In the same manner are prepared,

Succus spissatus aconiti napelli. *Ed.*
Inspissated Juice of Wolfsbane, from the leaves.

Succus spissatus atropæ belladonæ. *Ed.*
Inspissated Juice of Deadly Nightshade, from the leaves.

Succus spissatus conii maculati. *Ed.*
Inspissated Juice of Hemlock, from the leaves.

Succus spissatus hyosciami nigri. *Ed.*
Inspissated Juice of Henbane, from the plant.

Succus spissatus lactucæ sativæ. *Ed.*
Inspissated Juice of Garden Lettuce, from the plant.

Succus spissatus lactucæ virosæ. *Ed.*
Inspissated Juice of Poisonous Lettuce, from the plant.

Succus spissatus sambuci nigri. *Ed.*
Inspissated Juice of Elder Berries.

Take of
- Juice of ripe elder berries, five parts;
- Refined sugar, one part.

Evaporate with a gentle heat, to the consistence of pretty thick honey.

SUCCUS SPISSATUS CICUTÆ. *Dub.*
Inspissated Juice of Hemlock.

Express the leaves of hemlock, gathered when the flowers are just appearing, and allow the juice to stand six hours, until the fæces subside; then reduce the decanted juice to the thickness of an extract, with a moderate heat.

EXTRACTUM ACONITI. *Lond.*
Extract of Monkshood.

Take of
Monkshood leaves, fresh, one pound.

Bruise them in a stone mortar, sprinkling a little water upon them: then express the juice, and evaporate it without separating the sediment, to a proper thickness.

IN the same manner are prepared,

EXTRACTUM BELLADONÆ. *Lond.*
Extract of Deadly Nightshade.

EXTRACTUM CONII. *Lond.*
Extract of Hemlock.

EXTRACTUM HYOSCIAMI. *Lond.*
Extract of Henbane.

THESE are more properly termed Inspissated Juices, than Extracts. The inspissated juice is a very convenient form for the exhibition of those substances which are sufficiently succulent to afford a juice by expression, and whose virtues do not reside in any very volatile matter. By inspissation, the bulk of the requisite dose is very much diminished; they are reduced to a form convenient for making up into pills; and they are much less apt to spoil than the simple expressed juices.

Those enumerated contain the virtues of the respective vegetables in a very concentrated state. Those of the elder, black currant, and lemon, are acidulous, cooling, and laxative, and may be used in considerable quantities, while those of the wolfsbane, hemlock, deadly nightshade, henbane, and poisonous lettuce, when properly prepared, are highly narcotic and deleterious, and must be given only in very small doses. The nature of the soil, of the season, and many other circumstances, however, materially alter the quantity and nature of the product. The mode of their preparation is not yet reduced to fixed principles. Some pharmaceutists direct the uices to be inspissated as soon as they are expressed; others allow them previously to undergo a slight degree of fermenation; some, as the London and Edinburgh Colleges, inspissate the entire juices; while others, as the Dublin College, previously defecate them before they proceed to inspissate them. What the effect of this feculum is upon the virues, consistency, or durability, of the inspissated juices, is ot well ascertained. In some foreign Pharmacopœias, we ind two inspissated juices of the same article, one *cum æcula,* and another *sine fæcula.* Lastly, Baumé, rejecting he deposit, prepares his Elaterium by inspissating the deecated juice of the wild cucumber, while our colleges reject he fluid part, and preserve the matter which subsides from t.

The degree of heat, to which vegetable juices should be ubjected during their inspissation, is also still unsettled. Alnost all of them contain an albuminous matter, which is oagulated, or at least considerably changed by a boiling heat. t does not appear that this in any way contributes to the virues of the juice, but that if left in its natural state it acts as ferment, and gives them a great tendency to decomposition. In this case, whether we intended to separate or not, it would e advisable to heat the expressed juice, until the albumious principle was coagulated, before we proceeded to the inal inspissation. After this, the lower the temperature at vhich the inspissation is completed the better, provided it be lone sufficiently quickly to prevent all fermentation.

Mr Barry of Plough Court, London, has published, in he 10th volume of the Medico-Chirurgical Transactions, a ery ingenious method of evaporating vegetable juices and olutions *in vacuo* at a low temperature, by which all risk of rendering them empyreumatic is avoided, and their volatile principles are much better preserved.

ELATERIUM. *Dub.*

Elaterium.

Slice ripe wild cucumbers, express the juice very gently, and strain it through a very fine hair-sieve, into a glass vessel. Then set it aside for some hours until the thicker part subside. Reject the supernatant liquor, and dry with a moderate heat the feculum, laid upon and covered with a linen cloth.

EXTRACTUM ELATERII. *Lond.*
Extract of Elaterium.

Slice ripe wild cucumbers, express the juice very gently, and filter it through a very fine hair-sieve, into a glass vessel; then let it rest for some hours, until the thicker part subside. Throw away the thinner supernatant fluid, and dry the thicker part with a gentle heat.

THIS is not properly an inspissated juice, but a deposition from the expressed juice. Such depositions have long been called Fecula, whether they be mild and nutritious, such as starch; or drastic, such as the substance of which we are now treating.

Common filtration through paper does not succeed in this case; the deposition forming a glutinous varnish upon the paper, through which the liquid cannot pass. The separation is to be effected by drawing off the fluid from the top, by capillary filtration, and finishing it by compression between folds of linen.

PULPS.

PULPARUM EXTRACTIO. *Ed.*
Extraction of Pulps.

Boil unripe pulpy fruits, and ripe ones, if they be dry, in a small quantity of water, until they become soft; then press out the pulp through a hair-sieve, and afterwards boil it down to the consistence of honey, in an earthen vessel, over a gentle fire, taking care to stir the matter continually, to keep it from burning.

The pulp of *Cassia fistularis* is, in like manner, to be boiled out from the bruised pod, and reduced afterwards to a proper consistence, by evaporating the water.

The pulps of fruits that are both ripe and fresh are to be expressed through the sieve, without any previous boiling.

Dub.

Fruits, whose pulps are to be extracted, if they be unripe, or ripe and dry, are to be boiled in a little water until they become soft. Then the pulps, expressed through a hair-sieve, are to be evaporated to a proper degree of thickness.

Lond.

Set *pulpy fruits*, if they be unripe, or if ripe and dry, in a moist place, until they become soft; then press the pulps through a hair-sieve: afterwards boil them with a gentle heat, and stir them frequently; and, lastly, evaporate the water in a water-bath, until the pulps acquire the proper consistency.

Pour boiling water on the bruised pods of the *Cassia*, so as to wash out the pulp; which is then to be pressed, first through a coarse sieve, and afterwards through a hair-sieve; lastly, evaporate the water in a water-bath, so as to reduce the pulp to a proper consistency.

Express the pulp, or juice of ripe and recent fruits through a sieve, without boiling them.

THERE are very few pulps now used to which these directions are applicable. Heps, prunes, tamarinds, figs and cassia fistularis are all that are employed in any pharmaceutical composition. Of these the hep is always used fresh, the tamarind is always sufficiently soft, and the cassia pods and figs dry, and the prunes soft or dry.

When it is necessary to soften them, the decoction, or stewing ordered by the Edinburgh and Dublin Colleges, is in every respect preferable to exposing them to a moist air, which is not only often inefficacious, but is apt to render them mouldy. On the other hand, the precaution used by the London College, of finishing the evaporation in a water-bath, is highly proper, as otherwise they are extremely apt to become empyreumatic.

CHAP. XVIII.—FIXED OILS.

THESE oils are commonly denominated Expressed Oils, an appellation which is manifestly improper; as, in some instances, they are obtained without expression, and, in others, expression is employed to obtain volatile oils. The Edinburgh College have therefore distinguished these different classes of oils by the terms Fixed and Volatile, which accurately characterise them.

Fixed oil is formed in no other part of vegetables than in their fruit. Sometimes, although very rarely, it is contained in the parenchyme of the fruit. Of this the best known example is the olive. But it is most commonly found in the seeds of dicotyledonous vegetables, sometimes also in the fruit of monocotyledonous plants, as the cocos butyracea.

Fixed oils have various degrees of consistency, from the tallow of the croton sebiferum of China, and the butter of the butter-tree of Africa, to the fluidity of olive oil; but in general they are transparent, more or less coloured, somewhat viscid, inodorous fluids, having a mild taste and unctuous feel. In the different species the specific gravity varies from 0.9403 to 0.9153. The point of congelation also differs considerably, but in general it is within the range of the ordinary temperatures of the atmosphere. Their boiling point exceeds 600°; and by being converted into vapour, they become empyreumatic. Fixed oils do not seem capable of combining with charcoal, but are freed from impurities by being filtered through hot charcoal. When assisted by heat, they dissolve sulphur and phosphorus. They may be blended with sugar and gum by trituration, as in emulsions, and they dissolve the volatile oils, resins, and gummy resins. With the alkalies and earths they form soaps, and with metallic oxides plasters. They are not soluble in water, but have various habitudes in regard to alcohol. They unite readily with oxygen, which renders them concrescible. Those oils which dry without losing their transparency, as linseed oil, are termed drying oils, in contradistinction to the fat oils, which from exposure become white, opaque and thick, and remain greasy, such as oil of olives or of almonds. When they become rancid, they undergo a further degree of decomposition, and are found to contain sebacic acid. Oil in the state of vapour is inflammable, and burns with a white flame. When the combustion is complete, the products are carbonic acid gas and water, but in general soot is also deposited. The sulphuric acid renders the fixed oils brown and thick, and converts them into water and charcoal. The nitric acid oxygenizes them. The oxygenized muriatic acid or chlorine blanches them, and renders them concrete, like tallow or wax. The oils oxidize several of the metals, and are oxidized by several of their oxides.

Fixed oil is separated from the fruits and seeds which contain it, either by expression or decoction.

When obtained by expression, oils often contain a mixture of mucilage, starch, and colouring matter; but part of these are gradually deposited. Heat, by rendering the oil more limpid, increases very much the quantity obtained by expression; but it renders it less bland, and more apt to become rancid, therefore heat is not used in the preparation of oils which are to be employed in medicine.

Those who prepare large quantities of the oil of almonds blanch them, by steeping them in very hot water, which causes their epidermis to swell and separate easily. After peeling them they dry them in a stove, then grind them in a mill like a coffee-mill, and lastly, express the oil from the paste, inclosed in a hempen bag. By blanching the almonds, the paste which remains within the bag is sold with greater advantage to the perfumers, and the oil obtained is perfectly colourless. But the heat employed disposes the oil to become rancid, and the slight colour the oil acquires from the epidermis does not injure its qualities. For pharmaceutical use, therefore, the almonds should not be blanched, but merely rubbed in a piece of coarse linen, to separate as much as possible the brown powder adhering to the epidermis. Sixteen ounces of almonds commonly give five ounces and a half of oil. It is indifferent whether sweet or bitter almonds are employed, as the bitterness of the latter is not imparted to the expressed oil unless heat be employed.

Decoction is principally used for the extraction of the viscid and consistent oils, which are melted out by the heat of the boiling water, and rise to its surface.

When oils become rancid, they are no longer fit for internal use, but are then said to effect the killing of quicksilver, as it is called, more quickly.

OLEUM AMYGDALÆ COMMUNIS. *Ed.*
Oil of Almonds.

After having bruised fresh almonds in a stone mortar, put them into a hempen bag, and express the oil, without heat.

In the same manner express from the seeds,

OLEUM LINI USITATISSIMI. *Ed.*
Oil of Linseed.

OLEUM AMYGDALARUM. *Dub.*
Oil of Almonds.

Bruise fresh almonds in a mortar, and express the oil in a press, without heat.

OLEUM LINI. *Dub.*
Oil of Linseed,

Is expressed in the same way from the seeds.

OLEUM AMYGDALARUM. *Lond.*
Oil of Almonds.

Macerate almonds, either sweet or bitter, in cold water, for twelve hours, and bruise them. Then express the oil, without heat.

OLEUM LINI. *Lond.*
Oil of Linseed.

Bruise the seeds of common flax, and express the oil, without heat.

OLEUM RICINI. *Lond.*
Castor Oil.

Bruise the peeled seeds, and express the oil without heat.

CHAP. XIX.—OILY PREPARATIONS.

LINIMENTUM AMMONIÆ FORTIUS. *Lond.*
Stronger Liniment of Ammonia.

Take of
Water of ammonia, one fluidounce;
Olive oil, two fluidounces.
Shake them together until they mix.

OLEUM AMMONIATUM. *Ed.*
Ammoniated Oil.

Take of
Olive oil, eight parts;
Water of ammonia, one part.
Mix them together.

LINIMENTUM AMMONIÆ. *Dub.*
Liniment of Ammonia.

Take of
Water of caustic ammonia, two drachms by measure;
Olive oil, two ounces by measure.
Mix them.

LINIMENTUM AMMONIÆ SUBCARBONATIS. *Lond.*
Liniment of Subcarbonate of Ammonia.

Take of
Solution of subcarbonate of ammonia, one fluidounce;
Olive oil, three fluidounces.
Shake them together till they are mixed.

THESE are ammoniacal soaps. The three first are chemically correct, and differ only in strength, the first containing more ammonia than the others. The last is a very injudicious preparation. If the subcarbonate be employed with the view of rendering the preparation less stimulating, the same end is more scientifically obtained, by increasing the proportion of oil mixed with pure ammonia, as the subcarbonate does not unite chemically with oil.

Medical use.—They are frequently used externally as stimulants and rubefacients. In inflammatory sore throats, a piece of flannel moistened with these soaps, applied to the throat, and renewed every four or five hours, is a most efficacious remedy. When too strong, or too liberally applied, they sometimes occasion inflammation, and even excite blisters. Where the skin cannot bear their acrimony, a larger proportion of oil may be used.

But they are even sometimes used internally, made into a mixture with syrup and some aromatic water. A drachm or two taken in this manner, three or four times a-day, is a powerful remedy in some kinds of catarrh and sore throat.

OLEUM LINI CUM CALCE, sive LINIMENTUM AQUÆ CALCIS. *Ed.*
Liniment of Lime Water, or *Linseed Oil with Lime.*

Take of
Linseed oil,
Lime-water, of each equal parts.
Mix them.

LINIMENTUM CALCIS. *Dub.*
Lime Liniment.

Take of
Lime-water,
Olive oil, of each three ounces by measure.
Shake them together till they mix.

THIS liniment, commonly called Carron Oil, is extremely useful in cases of scalds or burns, being singularly efficacious in preventing, if applied in time, the inflammation subsequent to these; or even in removing it, after it has come on.

It is also a soap, with great excess of oil, which separates on standing.

OLEUM CAMPHORATUM. *Ed.*
Camphorated Oil.

Take of
  Olive oil, eight parts;
  Camphor, one part.
Triturate them together till the camphor be dissolved.

Dub.

Take of
  Olive oil, two ounces, by measure;
  Camphor, half an ounce.
Triturate them together.

THIS is a simple solution of camphor in fixed oil, and is an excellent application to local pains, from whatever cause, and to glandular swellings.

OLEUM SULPHURATUM. *Ed.*
Sulphuretted Oil.

Take of
  Olive oil, eight parts;
  Sublimed sulphur, one part.
Boil them together with a gentle fire in a large iron pot, stirring them continually till they unite.

Lond.

Take of
  Washed sulphur, two ounces;
  Olive oil, a pint.
Gradually add the sulphur to the oil, heated in a very large iron vessel, and stir constantly with a spatula, till they have united.

THIS is the old Balsam of Sulphur, but the directions for preparing it are not sufficiently precise. It is intended that the oil should be partially decomposed or burnt, and the preparation is expected to be an extremely fœtid and acrid fluid, of great viscidity and of a dark reddish brown colour. The oil must be therefore heated to the boiling point, when by reacting on the sulphur it emits very suffocating fumes. The pot must be sufficiently large, as the mixture swells and boils up very much; and as it is apt to catch fire, a lid should be at hand to extinguish it by covering up the pot. But by the aid of a gentle heat, oil is capable of dissolving a considerable proportion of sulphur without any decomposition, and if saturated, the sulphur will crystallize on cooling.

Medical use.—Balsam of sulphur was formerly strongly recommended in coughs, consumptions, and other disorders of the breast and lungs: but it is manifestly acrid and irritating, and should therefore be used with the utmost caution. It has frequently been found to injure the appetite, offend the stomach and viscera, parch the body, and occasion thirst and febrile heats. The dose is from ten to forty drops. It is employed externally for cleansing and healing foul running ulcers.

CHAP. XX.—VOLATILE OILS.

VOLATILE oils are generally described by chemical writers as being volatilized by a heat not exceeding 212° Fahr. without decomposition. But this is an error; for when heated alone, they do not rise until a heat considerably above 212° be applied, and they are greatly changed by decomposition. But they rise at 212° unchanged, along with aqueous vapour; or we may consider them as soluble in aqueous vapour, and on the condensation of the water, being very sparingly soluble in it, they separate from it, and swim on its surface, or sink in it, according to their specific gravity; dropt upon paper they evaporate completely, without leaving a greasy stain; are sapid, often pungent, and odorous; and are soluble in alcohol, and to a certain degree in water. They are more inflammable than the fixed oils, and burn with a large white flame, emit a great deal of smoke, and require more oxygen for their combustion. By exposure to the air they become coloured and thick, and are at last converted into an almost inodorous resin. They are also oxidized and converted into resins by muriate of mercury and muriate of antimony; the acids act on them with great violence, and are even capable of inflaming them. On the other hand, they resist considerably the action of the alkalies. In other respects, these oils are infinitely varied, especially in their taste and odour. Some are as limpid as water, others are viscid, others congeal on a slight diminution of temperature, and are even naturally concrete, and others are capable of forming crystallizations. Their predominant colours are the different shades of yellow and red, but there are also blue, green and glaucous essential oils. Their specific gravity varies from 0.8697 to 1.0439.

Volatile oils are obtained only from odoriferous substances; but some strong smelling substances yield extremely little oil, and others none at all. Roses and chamomile flowers, whose strong and lasting smell promises abundance, are found to contain but a small quantity of oil; the violet and jessamine flower, which perfume the air with their odour, lose their smell upon the gentlest coction, and do not afford any oil on being distilled, unless very large quantities are submitted at once to the operation: while savin, whose disagreeable scent extends to no great distance, yields volatile oil in abundance.

Nor is the same plant equally fit for this operation, when produced in different soils or seasons, or at different times of their growth. Some yield more oil if gathered when the flowers begin to fall off than at any other time. Of this we have examples in lavender and rue; others, as sage, afford the largest quantity when young, before they have sent forth any flowers; and others, as thyme, when the flowers have just appeared. All fragrant herbs yield a larger proportion of oil, when produced in dry soils, and in warm summers, than in opposite circumstances. On the other hand, some of the disagreeable strong-scented plants, as wormwood, are said to contain most oil in rainy seasons, and when growing in moist rich grounds.

Several chemists think, that herbs and flowers, moderately dried, yield a greater proportion of volatile oil, than if distilled when fresh. Drying may be useful, either by diminishing the bulk of the subject to be distilled, or by causing it to part with its oil more easily; besides aromatic waters, distilled from the dry herb, are more fragrant than from the fresh. Large quantities of the oils of lavender, peppermint, spearmint, and pennyroyal, are annually distilled in this country from the fresh herb. The oils of aniseed, chamomile, caraway, juniper, origanum, rosemary and pimento, are usually imported.

The choice of proper instruments is of great consequence for the performance of this process to advantage. There are some oils which pass freely over the swan neck of the head of the common still: others, less volatile, begin to condense on the least reduction of the temperature of the vapour. For obtaining these, we would recommend a large head, having a rim or hollow canal round it, to detain and convey into the receiver, whatever oil and water is condensed on the inside of the head.

The proportion of water to be employed varies. The water and ingredients together should never take up more than three-fourths of the still; there should in short be fluid enough to prevent any risk of burning, but not so much as to be in danger of boiling over into the receiver.

The subject of distillation if dry should be macerated in the water until it be perfectly penetrated by it. To promote this effect, woods should be thinly shaved, or sawn across the grain, roots cut transversely into thin slices, barks reduced into coarse powder, and seeds slightly bruised. Very compact and tenacious substances require the maceration to be continued a week or longer; for those of a softer and looser texture, two or three days are sufficient; herbs and flowers stand in no need of maceration, and are even injured by it.

The fire ought to be quickly raised, and kept up during the whole process.

The greater number of oils require for their distillation the heat of water strongly boiling; but there are many also which rise with a heat considerably less; such as those of lemon and citron peel, of the flowers of lavender and rosemary, and of almost all the more odoriferous kinds of flowers. We have already observed, that these flowers have their fragrance much injured, or even destroyed, by beating and bruising them; it is impaired also by immersion in water. For the distillation of substances of this kind another method has been contrived: instead of being immersed in water, they are exposed only to its vapour. A proper quantity of water being put into the bottom of the still, the odoriferous herbs or flowers are laid lightly into a basket, of such a size that it may enter into the still, and rest against its sides, just above the water. The head being then fitted on, and the water made to boil, the steam, percolating through the subject, dissolves the oil, without impairing its fragrance, and carries it over into the receiver.

But the most certain method of avoiding all empyreuma and foreign flavour, is by distillation *in vacuo*. By removing the pressure of the atmosphere, water boils at a temperature much below what is capable of decomposing any vegetable matter, and carries over with it volatile oil, if present, in a state of great purity. Accordingly, the most elegant volatile oils I have ever seen were prepared by distillation *in vacuo* by Mr Barry, the inventor of the process.

Plants differ so much, according to the soil and season of which they are the produce, and likewise according to their period of growth, that it is impossible to fix the quantity of water to be drawn from a certain weight of them. The distillation may always be continued as long as the liquor comes over well flavoured, but no longer.

The mixture of water and oil which comes over may either be separated immediately, by means of a separatory, or after it has been left at rest in large narrow-necked bottles, in a cool place, until the complete separation of the oil.

The water employed in the distillation of volatile oils always imbibes some portion of the oil, as is evident from the smell, taste, and milky colour which it acquires. It cannot, however, retain above a certain quantity; and hence, such as has been already used, and therefore almost saturated, may be advantageously employed, instead of common water, in a second, or any future distillation of the same subject.

After the distillation of one oil, particular care should be had to clean the condensing apparatus perfectly before it be employed in the distillation of a different substance. Some oils, those of wormwood and aniseeds, for instance, adhere so tenaciously, as not to be melted out by heat, or washed off by water; the best way of removing these is to run a little spirit of wine through the condenser.

Volatile oils, after they are distilled, should be suffered to stand for some days, in vessels loosely covered with paper, till they have lost the disagreeable fiery odour which they have when newly distilled, and become limpid. They are then put up in small bottles, which are to be kept quite full, and closely stopped, in a cool place. With these precautions, they will retain their virtues in perfection for many years.

The distilled oils are frequently much adulterated. The grosser abuses may be readily detected. Thus, if the oil be mixed with alcohol, it will turn milky on the addition of water; if with expressed oils, they leave a greasy stain on paper, or alcohol will dissolve the volatile, and leave the other behind; if with oil of turpentine, on dipping a piece of paper in the mixture, and drying it with a gentle heat, the turpentine will be betrayed by its smell. But other methods of sophistication have been contrived, which elude all tests of this kind.

As all volatile oils agree in the general properties of solubility in spirit of wine, sparing solubility in water, miscibility with water, by the intervention of certain substances, volatility in the heat of boiling water, &c., it is plain that they may be variously mixed with each other, and the dearer may be sophisticated with the cheaper, without any possibility of discovering the abuse by any trials of this kind: and, indeed, it is of as much importance that they be *good*, as that they be *genuine ;* for genuine oils, from inattentive distillation, and long and careless keeping, are often weaker, both in smell and taste, than the common sophisticated oils.

The smell and taste seem to be the only certain tests of which the nature of the thing will admit. If a bark should have in every respect the appearance of good cinnamon, and should be proved indisputably to be the genuine bark of the cinnamon tree, yet if it want the cinnamon flavour, or has it but in a low degree, we reject it; and the case is the same with the oil. It is only from use and habit, or comparison with specimens of known quality, that we can judge of the goodness, either of the drugs themselves, or of their oils.

Some of the volatile oils are too hot and pungent to be tasted with safety; but we can readily dilute them to any assignable degree. A drop of the oil may be dissolved in spirit of wine, or received on a bit of sugar, and dissolved by that means in water. The quantity of liquor which it thus impregnates with its flavour, or the degree and quality of flavour which it communicates to a certain determinate quantity of liquor, will be the measure of the goodness of the oil.

OLEA VOLATILIA. *Ed.*

Volatile Oils.

Only so much water is to be added to the substance, as will be sufficient to prevent it from being burnt when distilled. The distillation is to be performed after due maceration, and the oil is, lastly, to be separated from the water.

Besides, in preparing these distilled waters and oils, it is to be observed, that the goodness of the subject, its texture, the season of the year, and similar causes, must give rise to so many differences, that no certain or general rule can be given to suit accurately each example. Therefore many things are omitted, to be varied by the operator according to his judgment, and only the most general precepts are given.

OLEA DESTILLATA. *Lond.*
Distilled Oils.

The seeds of anise and caraway, the flowers of chamomile and lavender, the berries of juniper and allspice, the tops of rosemary, and the fresh herbs of the other articles, are to be used for the production of their respective oils.

Each of these is to be put into an alembic, and covered with water, and the oil drawn off by distillation into a large refrigeratory.

The water which is distilled over with the oils of caraway, peppermint, mint, allspice, and pennyroyal, is to be kept for use.

Dub.

Let the oil be extracted, by distillation, from the subject previously macerated in water, with the addition of as much water as may be sufficient to prevent empyreuma.

In distilling fennel, peppermint, spearmint, pennyroyal, and pimento, the liquor which comes over along with the oil is to be preserved for use in the manner directed in the chapter on Distilled Waters.

According to these directions, prepare

OLEUM VOLATILE. *Ed.* ——— DISTILLATUM. *Lond. Dub.*	Volatile, or distilled oil of
ANTHEMIDIS NOBILIS. *Ed.* ——— *Lond.*	Chamomile, *from the flowers.*
CARUI. *Dub. Lond.*	Caraway, *from the seeds.*
FŒNICULI DULCIS. *Dub.*	Fennel, *from the seeds.*
JUNIPERI COMMUNIS. *Ed.* ——— *Lond. Dub.*	Juniper, *from the berries.*
——— SABINÆ. *Ed.* SABINÆ. *Dub.*	Savine, *from the leaves.*
LAURI SASSAFRAS. *Ed.* SASSAFRAS. *Dub.*	Sassafras, *from the root, bark, and wood.*
LAVANDULÆ SPICÆ. *Ed.* ——— *Lond. Dub.*	Lavender, *from the flowering spikes.*
MENTHÆ PIPERITÆ. *Ed. Lond.* ——— PIPERITIDIS. *Dub.*	Peppermint, *from the recent herb in flower.*
——— SATIVÆ. *Dub.* ——— VIRIDIS. *Lond.*	Spearmint, *from the recent herb in flower.*
MYRTI PIMENTÆ. *Ed.* PIMENTO. *Dub.* PIMENTÆ. *Lond.*	Pimento, *from the fruit or berry.*

ORIGANI MAJORANÆ. *Ed.* ——— *Dub. Lond.*	Origanum, *from the recent herb in flower.*
PIMPINELLÆ ANISI. *Ed.* ANISI. *Lond. Dub.*	Aniseed, *from the seeds.*
PULEGII. *Lond. Dub.*	Pennyroyal, *from the recent herb in flower.*
RORISMARINI OFFICINALIS. *Ed.* ——— *Dub.* ROSMARINI. *Lond.*	Rosemary, *from the flowering tops.*
RUTÆ. *Dub.*	Rue, *from the herb in flower.*

Medical use.—Volatile oils, medicinally considered, agree in the general qualities of pungency and heat; in particular virtues, they differ as much as the subjects from which they are obtained, the oil being the direct principle in which the virtues, or at least a considerable part of the virtues, of the several subjects reside. Thus, the carminative virtue of the aromatic seeds, the diuretic of juniper berries, the emmenagogue of savine, the nervine of rosemary, the stomachic of mint, the cordial of aromatics, &c. are supposed to be concentrated in their oils.

There is another remarkable difference in volatile oils, the foundation of which is less obvious, that of the degree of their pungency and acrimony. These are by no means in proportion, as might be expected, to those of the subject they were drawn from. The oil of cinnamon, in its undiluted state, is almost caustic; whereas black pepper yields a comparatively bland oil. The pungency resides frequently in a fixed principle, and does not rise with the oil.

The more grateful oils are frequently made use of for reconciling to the stomach medicines of themselves disgustful. It has been customary to employ them as correctors for the resinous purgatives, an use to which they do not seem to be well adapted. All the service they can here be of is, to make the resin sit more easily at first on the stomach; far from abating the irritating quality upon which the violence of its operation depends, these pungent oils superadd a fresh stimulus.

Volatile oils are never given alone, on account of their activity. They are readily imbibed by a piece of dry sugar, and in this form may be conveniently exhibited. Rubbed with eight or ten times their weight of sugar, they become soluble in aqueous liquors, and thus may be diluted to any assigned degree. Mucilages also render them miscible with water into an uniform milky liquor. They dissolve likewise in alcohol; the more fragrant in an equal weight, and almost all of them in less than four times their own weight. These solutions may be either taken on sugar, or mixed with viscid fluids. On mixing them with water, the liquor grows milky, and the oil separates.

The more pungent oils, as those of cinnamon and origanum, are employed externally against paralytic complaints, numbness, pains and aches, cold tumours, and in other cases where particular parts require to be heated or stimulated. The toothach is sometimes relieved by a drop of these almost caustic oils, received on cotton, and cautiously introduced into the hollow tooth.

OLEUM TEREBINTHINÆ. *Dub.*
Oil of Turpentine.

Take of
Common turpentine, five pounds;
Water, four pints.

Distil the turpentine with the water in a copper alembic. After the distillation of the oil, what remains in the retort is *yellow resin.*

OLEUM VOLATILE PINI PURISSIMUM. *Ed.*
Purified Oil of Turpentine.

Take of
Oil of turpentine, one pint;
Water, four parts.

Distil as long as any oil comes over.

OLEUM TEREBINTHINÆ RECTIFICATUM. *Lond. Dub.*
Rectified Oil of Turpentine.

Take of
Oil of turpentine, one pint, (two pints, *Dub.*);
Water, four pints.

Distil the oil (to the extent of a pint and a half, *Dub.*)

OIL of turpentine is said not to have its specific gravity, smell, taste, or medical qualities, much improved by the process of rectification, which is both tedious and accompanied with danger. It must be conducted with very great care; for the vapour, which is apt to escape through the junctures of the vessels, is very inflammable.

Medical use.—This has already been spoken of in the Materia Medica, under the article *Pinus,* but Mr Kentish's employment of it in burns was merely alluded to. He first bathes the part with heated oil of turpentine, alcohol, or tincture of camphor, and then covers it up with rags dipped in oil of turpentine, melted with as much ointment of yellow resin, as is sufficient to give it the consistence of a liniment. These are to be renewed one at a time, once a-day. As the inflammation subsides, less stimulating applications are to be used; and when the secretion of pus commences, the parts are then to be covered with powdered chalk, heated to the temperature of the body. In this way, he assures us that he cured very many extensive burns in a few weeks, which, under the use of cooling applications, would have required as many months, or would have been altogether incurable.

Chap. XXI.—DISTILLED WATERS.

In the distillation of volatile oils, the water, as was observed in the preceding section, always retains a part of the oil, and derives from it smell, taste, and virtue.

All those vegetables, therefore, which contain an essential oil, will give over some virtue to water by distillation; but the degree of the impregnation of the water, and the quantity of water which a plant is capable of saturating with its virtue, are by no means in proportion to the quantity of the oil that it seems to contain. Some odoriferous flowers, as for example the rose, whose oil is in so small quantity, that scarcely a trace of it appears, unless fifty or an hundred pounds or more are distilled at once, give nevertheless as strong an impregnation to water as those plants which abound most with oil.

Many have been of opinion, that distilled waters may be more and more impregnated with the virtues of the subject, and their strength increased to any assigned degree, by *cohobation*, that is, by redistilling them repeatedly from fresh parcels of the plant. Experience, however, shews the contrary. Aqueous liquors are not capable of dissolving above a certain quantity of the volatile oil of vegetables; and this they may be made to take up by one, as well as by any number of distillations: the oftener the process is repeated, the ungrateful impression which they generally receive from the fire, even at the first time, becomes greater and greater.

Most distilled waters, when first prepared, have a somewhat unpleasant smell, which, however, they gradually lose: it is therefore advisable to keep them for some days after their preparation in vessels but slightly covered; and not to cork them up until they lose that smell.

Along with the distilled water there always comes over some other vegetable matter, which is gradually decomposed. That the waters may keep the better, about one-twentieth part their weight of proof-spirit may be added to each after they are distilled. I have been informed by a respectable apothecary, that if the simple distilled waters be rectified by distilling them a second time, they will keep for several years without the addition of any spirit, which always gives an unpleasant flavour, and is often objectionable for other reasons.

Mr Nicolson mentions, that as rose-water is exceedingly apt to spoil, the apothecaries generally prepare it in small quantities at a time from the leaves, preserved by packing them closely in cans with common salt. This is not the general practice.

The mode of preparing distilled waters, introduced into the London Pharmacopœia 1825, by mixing together a proper proportion of pure essential oil and water, and distilling them together to render their union complete, effectually precludes the possibility of their spoiling, as no mucilaginous principle can be present.

Distilled waters are employed chiefly as grateful diluents, as suitable vehicles for medicines of greater efficacy, or for rendering disgustful ones more acceptable to the palate and stomach; few of them, except oil of turpentine, are depended on, with any intention of consequence, by themselves.

Aquæ stillatitiæ. *Ed.*
Distilled Waters.

As much water is to be added to the substance as will be sufficient to prevent empyreuma after ten pounds are drawn off. After due maceration, draw off ten pounds, to which are to be added five ounces of weak spirit.

Aquæ distillatæ. *Dub.*
Distilled Waters.

To each pound of water, distilled from any vegetable substance, add half an ounce measure of rectified spirit.

Lond.

The waters are to be distilled from the dried herbs, unless otherwise ordered, because they are not to be had fresh at all times of the year. Whenever they are used fresh, their weight is to be doubled.

To every gallon of these waters add five fluidounces of proof-spirit, to preserve them.

AQUA DISTILLATA. *Lond.*
Distilled Water.

Take of

Water ten gallons.

Draw off by distillation, first, four pints; which being thrown away, draw off four gallons, which is to be kept in a glass bottle.

Dub.

Take of

Spring water, twenty pints.

Put it into a glass retort, and having thrown away the first pint which comes over, draw off one gallon by distillation with a gentle heat.

Ed.

Let water be distilled in appropriate and very clean vessels, until about two-thirds have come over.

WATER is never found pure in a state of nature; and as it is absolutely necessary, particularly for many chemical operations, that it should be perfectly so, we must separate it from all heterogeneous matters by distillation. The first portion that comes over should be thrown away, not so much from the possibility of its being impregnated with volatile matters contained in the water, as from the probability that it will be contaminated with impurities it may have contracted in its passage through the worm in the refrigeratory. The distillation is not to be pushed too far, lest the water should acquire an empyreumatic flavour.

Although distilled water be necessary for some purposes, we apprehend that it is an error to order it in many receipts, such as infusions and decoctions, for which good spring water answers just as well.

AQUA ANETHI. *Lond.*
Dill Water.

Take of

Dill seeds, bruised, one pound.

Pour upon them so much water, that enough may be left after the distillation to prevent empyreuma.

Draw off one gallon.

AQUA FŒNICULI DULCIS. *Dub.*
Fennel Water.

Take of

The bruised seeds of sweet fennel, one pound.

Water, as much as may be sufficient to prevent empyreuma.

Distil one gallon.

In the same manner, and in the same quantity, prepare,

AQUA	Water of
ANETHI. *Lond.*	Dill, *from one pound of the seeds, bruised.*
CARUI. *Lond.*	Caraway, *from one pound of the seeds bruised.*
CITRI AURANTII. *Ed.*	Orange-peel, *from two pounds of the fresh peel.*
CITRI MEDICÆ. *Ed.*	Lemon-peel, *from two pounds of the fresh peel.*
FŒNICULI. *Lond.*	Fennel, *from one pound of the bruised seeds.*
——— DULCIS. *Dub.*	Sweet Fennel, *from one pound of seeds bruised.*
LAURI CASSIÆ. *Ed.*	Cassia, *from one pound of the bark bruised.*
LAURI CINNAMOMI. *Ed.*	Cinnamon, *from one pound of the bark bruised.*
CINNAMOMI. *Lond.*	——— *from one pound of the bark bruised, and macerated for twenty-four hours in a pint of water; or from five scruples by weight of oil of cinnamon.*
CINNAMOMI. *Dub.*	——— *from one pound of the bark bruised, and macerated for a day.*
MENTHÆ PIPERITÆ. *Ed.*	Peppermint, *from three pounds of the herb.*
——— PIPERITIDIS. *Dub.*	——— *from one pound and a half.*
——— PIPERITÆ. *Lond.*	——— *from one pound and a half of the herb dried, or twice the quantity of the fresh herb; or from three drachms by weight of oil of peppermint.*
——— PULEGII. *Ed.*	Pennyroyal, *from three pounds of the herb.*
PULEGII. *Dub.*	——— *one and a half.*
——— *Lond.*	——— *one and a half dried, or double the quantity fresh; or from three drachms by weight of oil of pennyroyal.*

Aqua	Water of
Menthæ sativæ. *Dub.*	Spearmint, *one pound and a half.*
——— viridis. *Lond.*	——— *one pound and a half dried, or twice the quantity fresh; or from three drachms by weight of oil of mint.*
Myrti pimentæ. *Ed.*	Pimento, *half a pound bruised.*
Pimento. *Dub.*	——— *from half a pound bruised and macerated for a day.*
Pimentæ. *Lond.*	——— *from half a pound bruised, and macerated for twenty-four hours in a pint of water.*
Rosæ centifoliæ. *Ed.*	Rose, *from six pounds of the recent petals.*
——— *Dub.*	——— *from six pounds of the recent petals of the Damask rose.*
——— *Lond.*	——— *from eight pounds of the petals of the hundred-leaved rose.*

The virtues of all these waters are nearly alike; and the peculiarities of each will be easily understood, by consulting the account given in the Materia Medica of the substance from which they are prepared.

CHAP. XXII.

EMPYREUMATIC VOLATILE OILS.

Empyreumatic oils agree in many particulars with the volatile oils already treated of, but they also differ from them in several important circumstances. The latter exist ready formed in the aromatic substances from which they are obtained, and the process of distillation only separates them from the fixed principles. The former, on the contrary, are always formed by the action of a degree of heat considerably higher than that of boiling water, and are the product of decomposition, and a new arrangement of the elementary principles of substances, containing at least oxygen, hydrogen and carbon. Their production is therefore always attended with the formation of other new products. In their chemical properties they are in many respects analogous to the volatile oils, and are principally distinguished from them by their unpleasant pungent empyreumatic smell, and rough bitterish taste. They are also more apt to be affected by the contact of the air, becoming more coloured, and often depositing some black or flaky matter; and the oftener they are redistilled, they become more limpid, less coloured, and more soluble in alcohol; whereas the essential oils, by repeated distillations, become thicker and less soluble in alcohol.

Their action on the body is exceedingly stimulant and heating.

OLEUM SUCCINI PURISSIMUM. *Ed.*

Purified Oil of Amber.

Distil oil of amber in a glass retort, with six times its quantity of water, till two-thirds of the water have passed into the receiver; then separate this very pure volatile oil from the water, and preserve it in very close phials.

OLEUM SUCCINI. *Lond.*

Oil of Amber.

Put amber into an alembic, and distil from it in a sand-bath, with a gradually increased heat, an acid liquor, oil and salt impregnated with oil. Then redistil the oil twice.

Dub.

Take of
The oil which rises in the preparation of succinic acid, one pound;
Water six pints.

Distil until two-thirds of the water have come over; then separate the oil.

THE rectified oil has a strong bituminous smell, and a pungent acrid taste. Given in a dose of ten or twelve drops, it heats, stimulates and promotes the fluid secretions; it is chiefly celebrated in hysterical disorders, and in deficiencies of the uterine purgations. Sometimes it is used externally, in liniments, for weak or paralytic limbs, and rheumatic pains.

Empyreumatic oil is now procured in great quantity, and of extreme purity, as limpid as alcohol, and burning without residuum, as a bye product in the manufacture of coal gas; and in consequence of its cheapness it is now used for burning in lamps and in many manufactures, as the dissolving of caoutchouc. As a medicinal article it is identical with the finest oil of amber, and nothing inferior to the highly priced native naphtha.

OLEUM CORNU CERVINI RECTIFICATUM. *Dub.*
Rectified Oil of Hartshorn.

Take of
- The oil which ascends in the distillation of the volatile liquor of hartshorn, three pounds;
- Water, six pints.

Distil the oil, and redistil it with the water, until it becomes limpid. It ought to be kept in a dark place, and in small phials, completely filled and well corked.

THIS empyreumatic oil was formerly called Dippel's animal oil. When highly rectified, it is perfectly transparent, colourless, or merely tinged with yellow. It has a strong penetrating, peculiar, balsamic, not altogether disagreeable smell, and a pretty pungent, afterwards cooling and bitter taste. It is very volatile and inflammable, and one of the lightest fluids, and is sparingly soluble in water, by which means its adulterations with alcohol or unrectified spirit of hartshorn may be easily detected. By keeping, the utmost care is necessary to prevent it from becoming yellow, brown, and at last black, and acquiring an offensive smell and taste. In fact it does not differ from rectified oil of tar.

Medical use.—Dippel's oil was formerly highly esteemed, but probably owed part of its reputation to its rarity and high price. There can be little doubt of its being an highly diffusible stimulus and antispasmodic like ether; and now that it can be procured at a very low price, it deserves to have its virtues ascertained. In doses of from 13 to 30 drops, Hoffman reports, that it procures a calm and sweet sleep, which continues often for 20 hours, without being followed by any languor or debility, but rather leaving the patient more alert and cheerful than before: that it procures likewise a gentle sweat, without increasing the heat of blood: that, given to twenty drops or more, on an empty stomach, six hours before the accession of an intermittent fever, it frequently removes the disorder: and that it is likewise a very general remedy in inveterate and chronic epilepsies, and in convulsive motions, especially if given before the usual time of the attack, and preceded by proper evacuations.

Chap. XXIII.—DISTILLED SPIRITS.

The flavour and virtues of distilled waters are owing, as observed in a preceding chapter, to their being impregnated with a portion of the volatile oil of the subject from which they are drawn. Alcohol, considered as a vehicle for these oils, has this advantage above water, that it keeps all the oil, that rises with it, perfectly dissolved into an uniform limpid liquor, and allows no part of it to separate.

It is however remarkable, that while some aromatic substances readily yield their essential oil in distillation with spirit, others do not.

Thus, if cinnamon be distilled with proof-spirit, the alcohol will rise first, clear, colourless, and transparent, and almost without any taste of the spice; but, as soon as the more watery fluid begins to arise, the oil comes freely over with it, so as to render the liquor highly odorous, sapid, and of a milky hue.

The proof spirit usually met with in the shops is very rarely pure, or free from unpleasant flavour, which becomes very evident when employed for the preparation of distilled spirits. This nauseous flavour does not begin to arise till after the strongest alcohol has come over, which is the very time that the oil of the aromatics begins also to arise most plentifully; and hence the liquor receives an ungrateful taint. To this cause principally is owing the general complaint, that the cordials of the apothecary are less agreeable than those of the same kind prepared by the distiller; the latter being extremely curious in rectifying and purifying from all unpleasant flavour the spirits which he uses for what he calls Fine goods.

In the French Pharmacopœia these distilled spirits are now called *Alcoholats,* which is at least a convenient term.

Spiritus stillatitii. *Ed.*

Distilled Spirits.

To the substance to be distilled, add nine pounds of weaker alcohol. Macerate for two days in a close vessel; then pour on as much water as will avoid empyreuma, and draw off nine pounds.

SPIRITUS CARUI. *Dub.*
Spirit of Caraway.

Take of
Caraway seeds, bruised, half a pound;
Proof-spirit of wine, one gallon;
Water, sufficient to prevent empyreuma.
Draw off one gallon.

Lond.

Take of
Bruised caraway seeds, one pound and a half;
Proof-spirit, one gallon;
Water, enough to prevent empyreuma.
Macerate for twenty-four hours; and with a slow heat, distil one gallon.

In this manner, prepare in the same quantity,

SPIRITUS	*Spirit of*
CARI CARUI. *Ed.*	*Caraway,* from half a pound bruised.
CARUI. *Dub.*	——— half a pound, bruised.
——— *Lond.*	——— one pound and a half bruised.
LAURI CINNAMOMI. *Ed* CINNAMOMI. *Dub.*	*Cinnamon,* from one pound, bruised.
MENTHAE PIPERITAE. *Ed.*	*Peppermint,* one pound and a half of the herb.
MYRISTICAE. *Lond.* MYRISTICAE MOSCHATAE. *Ed.* NUCIS MOSCHATAE. *Dub.*	*Nutmeg,* two ounces, bruised.
MYRTI PIMENTAE. *Ed.*	*Pimento,* bruised, half a pound.
PIMENTO. *Dub.*	——— three ounces.
PIMENTAE. *Lond.*	——— two ounces.
ANISI. *Lond.*	*Aniseed,* half a pound, bruised.

The caraway spirit of the London College is three times stronger than the others, and the pimento spirit of Edinburgh four times as strong as that of London.

SPIRITUS CINNAMOMI. *Lond.*
Spirit of Cinnamon.

Take of
Oil of cinnamon, by weight, five scruples;
Rectified spirit, four pints and a half.
Add the oil to the spirit, and pour on as much water as will prevent empyreuma after the distillation is finished. Then draw off one gallon with a slow fire.

In the same manner, draw off in the same quantity,

SPIRITUS	*Spirit of*
MENTHAE PIPERITAE. *Lond.*	*Peppermint*, from six scruples and a half of oil of peppermint.
——— VIRIDIS. *Lond.*	*Mint*, from six scruples and a half of oil of mint.
PULEGII. *Lond.*	*Pennyroyal*, from seven scruples of oil of pennyroyal.
ROSMARINI. *Lond.*	*Rosemary*, from one ounce of oil of rosemary, and a gallon of rectified spirit.

The employment of the volatile oils, for the preparation of these distilled spirits, as directed in the last (1825) London Pharmacopœia, appears to me a great improvement, as it is both more economical, and prevents almost the possibility of empyreuma.

SPIRITUS LAVANDULÆ SPICÆ. *Ed.*
Spirit of Lavender.

Take of
  Flowering spikes of lavender, fresh, two pounds;
  Stronger alcohol, eight pounds.
Draw off, in a water-bath, seven pounds.

SPIRITUS LAVANDULÆ. *Lond.*
Spirit of Lavender.

Take of
  Fresh lavender flowers, two pounds;
  Rectified spirit, one gallon;
  Water, sufficient to prevent empyreuma.
Macerate for twenty-four hours, and, with a slow fire, draw off one gallon.

Dub.

Take of
  Fresh tops of lavender, one pound and a half;
  Proof-spirit of wine, one gallon;
  Water, sufficient to prevent empyreuma.
Draw off, by a moderate heat, five pints.

By these directions, and in the same quantity is prepared,

SPIRITUS RORISMARINI OFFICINALIS. *Ed.*	*Rosemary*, two pounds.
SPIRITUS RORISMARINI. *Dub.*	——— a pound and a half.

It is unnecessary to make particular observations on each of these simple spirits, as their virtues are the same with those of the substances from which they are extracted, united to the stimulus of the alcohol. The alcohol in the spirit of lavender and rosemary is almost pure; in the others, it is diluted with about an equal weight of water.

SPIRITUS ANISI COMPOSITUS. *Dub.*
Compound Spirit of Aniseed.

Take of
- Aniseed,
- Angelica seed, of each, bruised, half a pound;
- Proof-spirit, one gallon;
- Water, sufficient to prevent empyreuma.

Draw off one gallon by distillation.

THIS is a simplification of the Irish usquebaugh, which is generally coloured, either yellow by saffron and arnotto, or green by sap green. These compound spirits are agreeable cordials; indeed they are too agreeable; for by some they are so often resorted to, on the slightest sensation of flatulence in the stomach, that their use is attended with all the pernicious consequences of dram-drinking.

SPIRITUS JUNIPERI COMPOSITUS. *Ed.*
Compound Spirit of Juniper.

Take of
- Juniper berries, bruised, one pound;
- Caraway seeds,
- Sweet fennel seeds, each, bruised, one ounce and a half;
- Weaker alcohol, nine pounds.

Macerate for two days, and having added as much water as will prevent empyreuma, draw off, by distillation, nine pounds.

Lond.

Take of
- Juniper berries, bruised, one pound;
- Caraway seeds,
- Fennel seeds, of each, bruised, one ounce and a half;
- Proof-spirit, a gallon;
- Water, enough to prevent empyreuma.

Macerate for twenty-four hours, and distil, with a gentle heat, one gallon.

Dub.

Take of
  Juniper berries, bruised, one pound;
  Caraway seeds,
  Sweet fennel seeds, of each, bruised, an ounce and an half;
  Proof-spirit, a gallon.
Macerate for two days, and then add as much water as will prevent empyreuma, and draw off one gallon.

The good and bad effects of this spirit exactly coincide with those of gin. The Edinburgh and Dublin Colleges macerate only in the spirit; the London in the spirit and water.

SPIRITUS RAPHANI COMPOSITUS. *Dub.*
Compound Spirit of Horse-Radish.

Take of
  Fresh horse-radish root,
  Dried outer rind of Seville oranges, each two pounds;
  Fresh herb of garden scurvy-grass, four pounds;
  Bruised nutmegs, one ounce;
  Proof-spirit, two gallons;
  Water, sufficient to prevent empyreuma.
Draw off two gallons.

SPIRITUS ARMORACIÆ COMPOSITUS. *Lond.*
Compound Spirit of Horse-Radish.

Take of
  Fresh horse-radish root, sliced,
  Dried orange-peel, of each one pound;
  Nutmegs bruised, half an ounce;
  Proof-spirit, one gallon;
  Water, sufficient to prevent empyreuma.
Macerate for twenty-four hours, and distil, with a slow fire, one gallon.

This is an aromatic acrid spiritous liquor, but has no pretensions to the specific antiscorbutic properties formerly ascribed to it.

TINCTURA ASSÆFŒTIDÆ AMMONIATA. *Ed.*
Ammoniated Tincture of Assafœtida.

Take of
  Ammoniated alcohol, eight ounces;
  Assa fœtida, half an ounce.
Digest in a close vessel for twelve hours; then distil off, with the heat of boiling water, eight ounces.

SPIRITUS AMMONIÆ FŒTIDUS. *Lond.*
Fœtid Spirit of Ammonia.

Take of
  Spirit of ammonia, two pints;
  Assa fœtida, two ounces.
Macerate for twelve hours; and distil, with a slow fire, into a cooled receiver, one pint and a half.

Dub.

Take of
  Spirit of ammonia, two pints;
  Assa fœtida, an ounce and a quarter.
Digest in a close vessel, for three days, with occasional agitation. Pour off the clear liquor, and distil a pint and a half.

VOLATILE spirits, impregnated with different fœtids, have been usually kept in the shops as anti-hysterics: the ingredient here chosen is the best calculated of any for general use. The spirit is pale when newly distilled, but acquires a considerable tinge of brown by keeping.

TINCTURA AROMATICA AMMONIATA. *Ed.*
Aromatic Ammoniated Tincture.

Take of
  Ammoniated alcohol, eight ounces;
  Volatile oil of rosemary, one drachm and a half;
  Volatile oil of lemon-peel, one drachm.
Mix them, that the oils may be dissolved.

SPIRITUS AMMONIÆ AROMATICUS. *Dub.*
Aromatic Spirit of Ammonia.

Take of
  Spirit of ammonia, two pints;
  Essential oil of lemon, two drachms;
  Nutmegs, bruised, half an ounce.
Digest in a close vessel, for three days, with occasional agitation, and draw off a pint and a half.

Lond.

Take of
  Cinnamon bark, bruised,
  Cloves, bruised, of each two drachms;
  Lemon-peel, four ounces;
  Subcarbonate of potass, half a pound;
  Muriate of ammonia, five ounces;

Rectified spirit, four pints;
Water, one gallon.
Mix, and draw off six pints.

We have here three different modes of preparing a similar medicine. That of the Edinburgh College is a simple solution of the volatile oils in ammoniated alcohol, and succeeds perfectly if the ammonia in the solvent be caustic. Mr Phillips indeed says, that the oils as imported are commonly adulterated with fixed oil, which renders the aromatic spirit coloured and turbid, unless it be redistilled with them. If the ammoniated alcohol be weak and carbonated, it does not dissolve the oils here ordered, and it is therefore, in this case, the usual practice of chemists to distil the mixture of oils and spirit, which is the process of the Dublin College. In that of London the ammonia is disengaged from muriate of ammonia decomposed by subcarbonate o potass; and as it is evolved, it combines with the alcohol, and the compound spirit distils over impregnated with the volatile oils. Mr Phillips has pointed out that six ounces o subcarbonate of potass are insufficient to decompose five ounces of muriate of ammonia. Rather more than eigh ounces are required.

Medical use.—This preparation has the same medicina virtues as the simple ammoniated alcohol, but, from its com bination with the aromatic oils, is a more agreeable remedy The dose is from five or six drops to sixty or more.

Chap. XXIV.—INFUSIONS.

The term Infusion is confined to the action of a men struum, not assisted by ebullition, on any substance consist ing of heterogeneous principles, some of which are solubl and others insoluble in that menstruum. It is generall used in a more extensive, but, we are inclined to think, less correct sense: thus, lime-water and the mucilage which are commonly classed with the infusions, are instance of simple solution, and the chalk mixture is the mechanic suspension of an insoluble substance. When the menstruu used is water, the solution is termed simply an Infusion but when the menstruum is alcohol, it is called a Tincture when wine or vinegar, a Medicated Wine or Vinegar. Infusions in water are extremely apt to spoil, and are generally extemporaneous preparations.

AQUA CALCIS COMPOSITA. *Dub.*
Compound Lime Water.

Take of
 Guaiac wood, in shavings, half a pound;
 Liquorice root, sliced and bruised, an ounce;
 Sassafras bark, bruised, half an ounce;
 Coriander seeds, three drachms;
 Lime-water, six pints.

Macerate, without heat, for two days, and filter.

THIS, notwithstanding the name, may be considered as a compound infusion of guaiac, as the lime-water cannot fail to be decomposed during the preparation.

AQUA PICIS LIQUIDÆ. *Dub.*
Tar-Water.

Take of
 Tar, two pints;
 Water, one gallon.

Mix, by stirring them with a wooden rod, for a quarter of an hour, and after the tar has subsided, strain the liquor, and keep it in well-corked phials.

TAR-WATER should have the colour of white wine, and a sharp empyreumatic taste. It is, in fact, a weak pyrolignic acid, saturated with empyreumatic oil. It was at one time much extolled as a panacea, but has of late been little employed. It acts as a stimulant, raising the pulse, and increasing the discharge by the skin and kidneys. It may be drunk to the extent of a pint or two in the course of a day.

INFUSUM ANTHEMIDIS NOBILIS. *Ed.*
Infusion of Chamomile.

Take of
 Chamomile flowers, two drachms;
 Water, eight ounces.

Macerate for twenty-four hours, in a slightly covered vessel, and strain.

INFUSUM ANTHEMIDIS. *Lond.*
Infusion of Chamomile.

Take of
 Chamomile flowers, two drachms;

Boiling water, half a pint.
Macerate for ten minutes, in a vessel loosely covered, and filter.

This is a very common extemporaneous prescription under the title of *Chamomile tea.* It is a good stomachic.

INFUSUM ARMORACIÆ COMPOSITUM. *Lond.*
Compound Infusion of Horse-Radish.

Take of
Fresh horse-radish root, sliced,
Mustard seed, bruised, of each one ounce;
Boiling water, one pint.
Macerate for two hours, in a loosely covered vessel, and strain; then add, of
Compound spirit of horse-radish, one fluidounce.

This is a pungent and stimulant infusion.

INFUSUM AURANTII COMPOSITUM. *Lond.*
Compound Infusion of Orange-peel.

Take of
Orange-peel, dried, two drachms;
Lemon-peel, fresh, one drachm;
Cloves, bruised, half a drachm;
Boiling water, half a pint.
Macerate for ten minutes in a loosely covered vessel, and strain.

A stomachic infusion.

INFUSUM CALUMBÆ. *Lond.* INFUSUM COLOMBÆ. *Ed.*
Infusion of Colombo.

Take of
Colombo root, sliced, two drachms, (one drachm, *Ed.*);
Boiling water, half a pint, (eight ounces, *Ed.*)
Macerate for two hours in a loosely covered vessel, and strain.

A stomachic bitter.

INFUSUM CARYOPHYLLORUM. *Lond.*
Infusion of Cloves.

Take of
Cloves, bruised, one drachm;
Boiling water, half a pint.
Macerate for two hours in a vessel loosely covered, and strain.

An aromatic stimulant.

INFUSUM CASCARILLÆ. *Lond.*
Infusion of Cascarilla.

Take of
Cascarilla root, bruised, half an ounce;
Boiling water, half a pint.

Macerate for two hours in a loosely covered vessel, and strain.

An aromatic stimulant.

INFUSUM CINCHONÆ LANCIFOLIÆ. *Ed.*
Infusion of Cinchona Bark.

Take of
The bark of lance-leaved cinchona, in powder, one ounce;
Water, one pound.

Macerate for twenty-four hours in a slightly covered vessel, with occasional agitation, and filter.

INFUSUM CINCHONÆ. *Lond.*
Infusion of Cinchona.

Take of
The bark of lanced-leaved cinchona, bruised, half an ounce;
Boiling water, half a pint.

Macerate for two hours in a loosely covered vessel, and strain.

INFUSUM CINCHONÆ SINE CALORE. *Dub.*
Cold Infusion of Cinchona.

Take of
Peruvian bark, in coarse powder, one ounce;
Cold water, twelve ounces, by measure.

Triturate the bark with a little of the water, and add the remainder during the trituration. Macerate for twenty-four hours, and decant the pure liquor.

This is a very elegant form of exhibiting the active principles of cinchona bark, and that in which they will sit lightest on weak and delicate stomachs. The trituration directed by the Dublin College will promote the solution.

INFUSUM CUSPARIÆ. *Lond.*
Infusion of Angustura.

Take of
Angustura bark, bruised, two drachms;
Boiling water, half a pint.

Macerate for two hours in a loosely covered vessel, and strain.

A stimulant febrifuge.

INFUSUM DIGITALIS. *Lond.*
Infusion of Foxglove.

Take of
Foxglove leaves, dried, one drachm;
Boiling water, half a pint.
Macerate for four hours in a loosely covered vessel, and strain; then add
Spirit of cinnamon, half a fluidounce.

INFUSUM DIGITALIS PURPUREÆ. *Ed.*
Infusion of Foxglove.

Take of
Dried leaves of foxglove, one drachm;
Boiling water, eight ounces;
Spirit of cinnamon, one ounce.
Macerate the leaves in the water, for four hours, in a slightly covered vessel, then add the spirit, and filter.

THIS is the infusion so highly recommended by Withering. Half an ounce or an ounce of it may be taken twice a-day in dropsical complaints. The spirit of cinnamon is added to improve its flavour, and to counteract its sedative effects.

INFUSUM GENTIANÆ COMPOSITUM, *vulgo* INFUSUM AMARUM. *Ed.*
Compound Infusion of Gentian, or Bitter Infusion.

Take of
Gentian root, sliced, half an ounce;
Dried peel of Seville oranges, bruised,
Coriander seeds, bruised, each one drachm;
Diluted alcohol, four ounces;
Water, one pound.
First pour on the alcohol, and three hours thereafter add the water; then macerate without heat, for twelve hours, in a slightly covered vessel, and strain.

Lond.

Take of
The root of gentian, sliced,
Dried orange peel, each one drachm;
Fresh lemon-peel, two drachms;
Boiling water, twelve fluidounces.
Macerate for an hour in a loosely covered vessel, and strain.

Dub.

Take of
Bruised gentian root, two drachms;

Fresh lemon-peel, half an ounce;
Dried peel of Seville oranges, a drachm and a half;
Proof-spirit, four ounces, by measure;
Boiling water, twelve ounces, by measure.

First pour on the spirit, and after three hours the water. Lastly, after macerating two days, filter.

These formulæ are all essentially the same, except that in the London prescription there is no spirit, while in those of Edinburgh and Dublin its proportion is considerable, one to three of the water, and must be attended to in prescription. The Edinburgh College also adds coriander seeds, and employs the largest proportion of gentian; but they infuse it in cold water, which does not extract the bitter principle so quickly or so fully as boiling water, although it dissipates less of the flavour of the aromatics.

Medical use.—Gentian is the strongest and purest of the European bitters, and readily imparts its virtues to water. These infusions are in very common use as stomachic and tonic.

Infusum lini usitatissimi. *Ed.*
Infusion of Linseed.

Take of
Linseed, one ounce;
Liquorice root, bruised, two drachms;
Boiling water, two pounds.

Digest for four hours in a slightly covered vessel, and strain.

Infusum lini compositum. *Lond.*
Compound Infusion of Linseed.

Take of
Linseed, bruised, an ounce;
Liquorice root, sliced, half an ounce;
Boiling water, two pints.

Macerate for four hours, near the fire, in a closely covered vessel, and strain.

This is a mucilaginous emollient liquor, much used in gonorrhœas, strangury, and in pectoral complaints.

Infusum menthæ compositum. *Dub.*
Compound Infusion of Mint.

Take of
The leaves of spearmint, dried, two drachms.
Boiling water, as much as will afford six ounces of the infusion, when filtered.

Digest for half an hour, in a covered vessel; strain the liquor when cold, and then add of

Double refined sugar, two drachms;
Oil of spearmint, three drops, dissolved in
Compound tincture of cardamoms, half an ounce. Mix.

This infusion is slightly stimulating and diaphoretic, and forms a very agreeable herb-tea, which may be used in any quantity in diet, or as a vehicle for more active remedies.

INFUSUM ACACIÆ CATECHU. *Ed.*
Infusion of Catechu.

Take of

Extract of catechu, in powder, two drachms and a half;
Cinnamon bark, bruised, half a drachm;
Boiling water, seven ounces;
Simple syrup, one ounce.

Macerate the extract and cinnamon in the water, in a covered vessel, for two hours; then strain it through linen, and add the syrup.

INFUSUM CATECHU COMPOSITUM. *Lond.*
Compound Infusion of Catechu.

Take of

Extract of catechu, two drachms and a half;
Cinnamon bark, bruised, half a drachm;
Boiling water, half a pint.

Macerate for an hour in a loosely covered vessel, and strain.

As this preparation will not keep above a day or two, it must always be made extemporaneously. The long maceration, therefore, becomes very often extremely inconvenient; but it may be prepared in a few minutes, by boiling, without in the least impairing the virtue of the medicine.

Medical use.—Extract of catechu abounds with tannin. This infusion is therefore a powerfully astringent solution. The cinnamon and syrup render it sufficiently agreeable; and it will be found serviceable in diarrhœas proceeding from a laxity of the intestines. Its dose is a spoonful or two every other hour, or after every loose stool.

INFUSUM QUASSIÆ EXCELSÆ. *Ed.*
Infusion of Quassia.

Take of

Shavings of quassia wood, half a drachm;
Boiling water, eight ounces.

Macerate for two hours in a slightly covered vessel, and strain.

INFUSUM QUASSIÆ. *Lond.*
Infusion of Quassia.

Take of
Quassia shavings, a scruple;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.

ONE of the most intense and purest bitters.

INFUSUM RHEI. *Ed.*
Infusion of Rhubarb.

Take of
Russian rhubarb, bruised, half an ounce;
Boiling water, eight ounces;
Spirit of cinnamon, one ounce.
Macerate the rhubarb in a close vessel with the water for twelve hours; then add the spirit, and strain the infusion.

Lond.

Take of
Rhubarb root, sliced, a drachm;
Boiling water, half a pint.
Macerate for two hours in a loosely covered vessel, and strain.

THIS appears to be one of the best preparations of rhubarb when not designed as a purgative; water extracting its virtues more effectually than either vinous or spiritous menstrua.

INFUSUM ROSÆ GALLICÆ. *Ed.*
Infusion of Roses.

Take of
The petals of red roses, dried, one ounce;
Boiling water, two pounds and a half;
Diluted sulphuric acid, half an ounce;
White sugar, one ounce.
Macerate the petals with the boiling water in an earthen vessel, which is not glazed with lead, for four hours, then add the acid, strain the liquor, and dissolve the sugar in it.

INFUSUM ROSÆ COMPOSITUM. *Lond.*
Compound Infusion of Roses.

Take of
Dried petals of red roses, half an ounce;
Diluted sulphuric acid, three fluidrachms;
Double refined sugar, an ounce and a half;

Boiling water, two pints and a half.

First pour the water on the petals in a glass vessel, then add the diluted sulphuric acid, and macerate for half an hour. Strain the liquor, and add to it the sugar.

INFUSUM ROSÆ. *Dub.*
Infusion of Roses.

Take of

The petals of red rose buds, dried and heeled, half an ounce;
Diluted sulphuric acid, three drachms, by weight;
Boiling water, three pints;
Double refined sugar, an ounce and a half.

First pour the water on the petals in a glass vessel, then add the acid, and digest for half an hour; filter the liquor when cold, and add the sugar.

THE difference in the directions for preparing this infusion are immaterial. In fact, the rose leaves have very little effect, except in giving the mixture an elegant red colour. Its subacid and astringent virtues depend entirely on the sulphuric acid. Altogether, however, it is an elegant medicine, and forms a very grateful addition to juleps in hæmorrhagies, and in all cases which require mild refrigerants and subastringents: it is sometimes taken with boluses or electuaries of Peruvian bark, and likewise makes a good gargle.

INFUSUM CASSIÆ SENNÆ. *Dub.*
Infusion of Senna.

Take of

Senna, three drachms;
Lesser cardamom seeds, husked and bruised, half a drachm;
Boiling water, as much as will yield a filtered infusion of six ounces.
Digest for an hour, and filter when cold.

Ed.

Take of

Senna leaves, six drachms;
Ginger root, bruised, one scruple;
Boiling water, nine ounces.

Macerate for an hour in a slightly covered vessel, and strain.

INFUSUM SENNÆ COMPOSITUM. *Lond.*
Compound Infusion of Senna.

Take of
Senna leaves, an ounce and a half;
Ginger root, sliced, one drachm;
Boiling water, one pint.
Macerate them for an hour in a loosely covered vessel, and strain.

THESE are convenient purgative infusions, but they differ considerably in strength; the senna being in the London, Edinburgh and Dublin receipts nearly as 1 to 10.5; 12 and 16 respectively. It is to be regretted that the London College should have added the epithet *compositum*, on account of the addition of a mere corrective, especially as the same name had been long appropriated to the next preparation of the Edinburgh College.

INFUSUM SENNÆ COMPOSITUM. *Ed.*
Infusion of Compound Senna.

Take of
Preserved tamarinds, one ounce;
Senna leaves, one drachm;
Coriander seeds, bruised, one drachm;
Brown sugar, half an ounce;
Boiling water, eight ounces.
Macerate for four hours, with occasional agitation, in a close earthen vessel, not glazed with lead, and strain the infusion.
It may also be made with double, triple, &c. the quantity of senna.

INFUSUM SENNÆ CUM TAMARINDIS. *Dub.*
Infusion of Senna with Tamarinds,

Is made as the infusion of senna, by adding, before the water is poured on, an ounce of tamarinds; then strain.

THIS forms a mild and useful purge, excellently suited for delicate stomachs, and inflammatory diseases. The taste of the senna is well covered by the acidity of the tamarinds.

INFUSUM SIMAROUBÆ. *Lond.*
Infusion of Simarouba.

Take of
Simarouba bark, bruised, half a drachm;

Boiling water, half a pint.

Macerate for two hours in a loosely covered vessel, and strain.

A simple bitter.

INFUSUM TABACI. *Lond.*
Infusion of Tobacco.

Take of

Tobacco leaves, a drachm ;

Boiling water, a pint.

Macerate for an hour in a loosely covered vessel, and strain.

THIS is a narcotic diuretic, which was used with much success in dropsies by Dr Fowler.

INFUSUM VALERIANÆ. *Dub.*
Infusion of Valerian.

Take of

Valerian root, in coarse powder, two drachms ;

Boiling water, seven ounces, by measure ;

Digest for half an hour, and strain when cold.

VALERIAN tea is a very excellent antispasmodic, and often proves serviceable in hysteric cases, where the stomach will not bear the powder in substance.

CHAP. XXV.—DECOCTIONS.

DECOCTIONS differ from infusions only in the action of the menstruum being assisted by a boiling heat. The increase of temperature facilitates and expedites the solution of some fixed principles, and so far as these are active it increases the power of the medicine, but at the same time it also extracts inert and nauseous principles, which remain untouched by simple infusion. By boiling also water often extracts more of some of the principles than it can retain when cold, and decoctions become muddy, and deposite on cooling. Likewise it gives some principles a tendency to decomposition, and dissipates all volatile matters. Decoction, therefore, can only be used with advantage for the extraction of principles which are neither volatilized nor altered by a boiling heat.

To promote the action of the menstruum, infusion is frequently premised to decoction, and they are occasionally conjoined.

In compound decoctions, it is sometimes convenient not to put in all the ingredients from the first, but in succession, according to their hardness, and the difficulty with which their virtues are extracted; and if any aromatic, or other substances, containing volatile principles, enter into the composition, the boiling decoction is to be simply poured upon them, and covered up until it cool.

Decoctions should be made in vessels sufficiently large to prevent any risk of boiling over, and should be continued without interruption, and gently.

DECOCTUM ALOES COMPOSITUM. *Lond.*
Compound Decoction of Aloes.

Take of
- Extract of liquorice, half an ounce;
- Subcarbonate of potass, two scruples;
- Extract of spiked aloes, in powder,
- Myrrh, in powder,
- Saffron, of each one drachm;
- Water, one pint;
- Compound tincture of cardamoms, four fluidounces.

Boil the liquorice, subcarbonate of potass, aloes, myrrh, and saffron, with the water, down to twelve fluidounces, and filter, then add the compound tincture of cardamom.

THIS is intended as a simplification and improvement of the *Baume de Vie de la Lièvre.* It is in fact a saponaceous solution of aloes, the subcarbonate of potass rendering its resin soluble in water; and in many cases of stomach complaints, the combination of an alkali with a bitter purgative may be advantageous. In the dose of two or three teaspoonfuls it is slightly purgative. The original *Baume de vie,* which, however, contained no alkali, was much employed externally as a detersive application to recent wounds, and to prevent suppuration.

DECOCTUM ANTHEMIDIS NOBILIS. *Ed.*
Decoction of Chamomile.

Take of
- Chamomile flowers, dried, one ounce;
- Caraway seeds, bruised, half an ounce;
- Water, five pounds.

Boil for a quarter of an hour, and strain.

DECOCTUM CHAMÆMELI COMPOSITUM. *Dub.*
Compound Decoction of Chamomile.

Take of
Chamomile flowers, dried, half an ounce;
Sweet fennel seeds, two drachms;
Water, one pint.
Boil a little, and strain.

DECOCTUM MALVÆ COMPOSITUM. *Lond.*
Compound Decoction of Mallow.

Take of
The leaves of mallow, dried, one ounce;
Chamomile flowers, dried, half an ounce;
Water, one pint.
Boil for fifteen minutes, and strain.

THESE decoctions are merely solutions of bitter extractive, combined, in the third with mucilage, and in the others with aromatics. In making them, the aromatic substances should not be added until the decoction is nearly completed; for, otherwise, their flavour will be entirely dissipated.

They are coarse preparations, and only used as glysters. It must, however, be acknowledged, that their impregnations are for the most part unnecessary; and, in general, the bulk and warmth of these produce a discharge before their medicinal principles can have any effect.

As fomentations, their virtues also depend, in a great measure, on the warm water, of which they principally consist; and when the herbs themselves are applied, they act only as retaining heat and moisture for a longer time; and are a less convenient, and not more useful fomentation, than cloths wrung out of hot water, or, what is still better, bladders half filled with hot water.

DECOCTUM CINCHONÆ LANCIFOLIÆ. *Ed.*
Decoction of Cinchona Bark.

Take of
Lance-leaved cinchona bark, bruised, one ounce;
Water, one pound and a half.
Boil for ten minutes in a covered vessel, and strain the liquor while hot.

DECOCTUM CINCHONÆ. *Lond.*
Decoction of Cinchona.

Take of
Lance-leaved cinchona bark, bruised, one ounce;

Water, one pint.

oil for ten minutes in a loosely covered vessel, and strain the liquor while hot.

DECOCTUM CORTICIS CINCHONÆ. *Dub.*

Decoction of Cinchona Bark.

ake of

Peruvian bark, in coarse powder, one ounce;

Water, one pint.

oil for ten minutes in a vessel almost covered, and strain the liquor while hot, through linen.

PELLETIER, to whom we owe so great an extension of our owledge of vegetable pharmacy, has commented upon the ecoction of cinchona. He says, that by the prolonged acon of boiling water, the cinchonate of cinchona is dissolved, ut at the same time the gum, starch, yellow colouring atter, cinchonate of lime, tannin, and a portion of the cinonic red are dissolved. These substances carry with them en a notable proportion of the greasy matter. The decoction ear as long as it is boiling, becomes turbid on cooling, beuse the tannin, united to the starch, forms a compound inluble in cold water; a part of the cinchonic red and greasy atter also separate, but these unfortunately carry with them part of the cinchonia. We may, however, in part remedy ese inconveniences, by increasing the quantity of the solnt, by which means almost all the cinchonia may be retain in solution; we may then filter the decoction, and conntrate it by evaporation. By this means M. Caventou inks we may prepare a decoction less turbid, less disreeable to take, and possessed of all the virtues the preparation can possess.

DECOCTUM DAPHNES MEZEREI. *Ed.*

Decoction of Mezereon.

ke of

The bark of mezereon, two drachms;

Liquorice root, bruised, half an ounce;

Water, three pounds.

il with a gentle heat, down to two pounds, and strain the decoction.

FROM four to eight ounces of this decoction may be given r times a-day, in some obstinate syphiloid and rheumatic ections. It operates chiefly by perspiration.

DECOCTUM DIGITALIS. *Dub.*
Decoction of Foxglove.

Take of
Foxglove leaves, dried, one drachm;
Water, as much as will furnish a strained decoction of eight ounces, by measure.

Place the vessel upon a slow fire, and, as soon as the liquor boils, remove it; then digest for a quarter of an hour, and strain.

THIS decoction, according to the proportions employed, is twenty times weaker than that so much praised by Dr Darwin; but with a medicine of so great activity, it is an advantage to be able to regulate the doses easily; and it is probable that the strength of the decoction is not increased in proportion as the quantity of the menstruum is diminished.

DECOCTUM GEOFFRÆÆ INERMIS. *Ed.*
Decoction of Cabbage-tree Bark.

Take of
Bark of the cabbage-tree, powdered, one ounce;
Water, two pounds.

Boil, with a gentle fire, down to one pound, and strain the decoction.

THIS is a powerful anthelmintic. It may be given in doses of one table-spoonful to children, and four to adults. If disagreeable symptoms should arise from an over dose, or from drinking cold water during its action, we must immediately purge with castor oil, and dilute with acidulated fluids.

DECOCTUM GUAIACI COMPOSITUM. *Ed.*
Compound Decoction of Guaiacum.

Take of
Guaiacum raspings, three ounces;
Raisins, two ounces;
Sassafras root, sliced,
Liquorice root, bruised, each one ounce;
Water, ten pounds.

Boil the guaiacum and resins with the water, over a gentle fire, down to five pounds, adding, towards the end, the sassafras and liquorice, and strain the decoction.

THIS decoction is of use in some rheumatic and cutaneous affections. It may be taken by itself to the quantity of a quarter of a pint, twice or thrice a-day, or used as an assistant in a course of mercurial or antimonial alteratives; the

atient, in either case, keeping warm, in order to promote
he operation of the medicine.

DECOCTUM DULCAMARÆ. *Lond.*

Decoction of Bittersweet.

ake of
Twigs of bittersweet, sliced, one ounce;
Water, one pint and a half.
oil to a pint, and strain.

For the virtues of this decoction, I must refer to what is
id in the Materia Medica.

DECOCTUM PAPAVERIS. *Lond.*

Decoction of Poppies.

ake of
White poppy heads, sliced, four ounces;
Water, four pints.
oil for a quarter of an hour, and strain.

This is in very common use, as an anodyne fomentation.

DECOCTUM POLYGALÆ SENEGÆ. *Ed.*

Decoction of Seneka.

ake of
Seneka root, one ounce;
Water, two pounds.
il down to sixteen ounces, and strain the decoction.

DECOCTUM SENEGÆ. *Lond.*

Decoction of Snake Root.

ke of
Snake root, one ounce;
Water, two pints.
il to one pint, and strain.

The virtues of this decoction will be easily understood
m those of the root from which it is prepared. The dose
hydropic cases, and rheumatic or arthritic complaints, is
o ounces, three or four times a-day, according to its ef-
t. It is also recommended, in affections of the lungs, at-
ded with debility, and inordinate secretion.

DECOCTUM QUERCUS ROBORIS. *Ed.*

Decoction of Oak Bark.

ke of
Oak bark, bruised, one ounce;

Water, two pounds and a half.
Boil down to sixteen ounces, and strain.

DECOCTUM QUERCUS. *Lond.*
Decoction of Oak Bark.

Take of
Oak bark, one ounce;
Water, two pints.
Boil to one pint, and strain.

THIS is a very powerful astringent, and may be used on all occasions where astringents are indicated. It is particularly serviceable as a gargle in sore throats and hoarseness, attended with relaxation of the parts.

DECOCTUM SMILACIS SARSAPARILLÆ. *Ed.*
Decoction of Sarsaparilla.

Take of
The root of sarsaparilla, sliced, six ounces;
Water, eight pounds.
Digest for two hours, with a heat of about 195°; then take out the root, and bruise it; when bruised, put it back into the same liquor, boil down to four pounds, then press out, and strain the decoction.

DECOCTUM SARSAPARILLÆ. *Dub.*
Decoction of Sarsaparilla.

Take of
Sarsaparilla root, sliced, an ounce and a half;
Boiling water, two pints.
Digest in a moderate heat, for two hours; then take out the sarsaparilla and bruise it; when bruised, put it back into the liquor, and repeat the digestion for two hours; then express the liquor, after it has been reduced to one half, through linen, and strain it.

Lond.

Take of
Sarsaparilla root, sliced, four ounces;
Boiling water, four pints.
Macerate for four hours in a loosely covered vessel, at the side of the fire; then take out the sarsaparilla root, and bruise it. When bruised put it again into the liquor: macerate for two hours more, then boil down to two pints, and strain

THE diaphoretic effects of this decoction are probably ow ng to its being drunk warm. By some it is thought useful n the sequelæ of syphilis, and in syphiloid affections its good effects are generally allowed.

Decoctum sarsaparillæ compositum. *Dub.*
Compound Decoction of Sarsaparilla.

Take of
Sarsaparilla, sliced and bruised, an ounce and a half;
Shavings of guaiacum wood,
Bark of the root of sassafras,
Liquorice root, bruised, of each two drachms;
Bark of mezereon root, one drachm;
Boiling water, three pints.

Macerate in the water, with a gentle heat, for six hours, the sarsaparilla, guaiac, and sassafras; then boil it down to one half, adding towards the end of the boiling, the liquorice and the mezereon, and strain the liquor.

Lond.

Take of
Decoction of sarsaparilla, boiling hot, four pints;
Sassafras root, sliced,
Guaiac wood, rasped,
Liquorice root, bruised, of each an ounce;
The bark of mezereon root, three drachms.

Boil for a quarter of an hour, and strain.

This compound decoction is said to be an improved mode of preparing the once highly celebrated Lisbon diet-drink, which, after its first introduction into Britain, was so long kept a secret.

It operates as a diaphoretic, and may be given with advantage in rheumatic cases, and in some of the sequelæ of syphilis. Three or four ounces may be taken four times a-day.

Decoctum ulmi. *Lond. Dub. Ed.*
Decoction of Elm.

Take of
The fresh inner bark of elm, bruised, four ounces;
Water, four pints, (four pounds. *Ed.)*

Boil to two pints, (two pounds and a half. *Ed.)*

Under this form the elm bark has been highly celebrated for the cure of certain cutaneous eruptions, but undeservedly, according to the experience of the most judicious practitioners.

DECOCTUM VERATRI. *Lond.*
Decoction of White Hellebore.

Take of
The root of white hellebore, in powder, one ounce;
Water, two pints;
Rectified spirit of wine, two fluidounces.
Boil the water with the root to one pint, and strain; after the liquor is cold, add to it the spirit.

THIS decoction is only used externally as a wash in porrigo, lepra, psora, &c. When the skin is very tender, and irritable, it should be diluted with an equal quantity of water. In estimating the virtues of this decoction, we must keep in mind that it contains a portion of the narcotic principle, veratria, to which the colchicum owes its powers.

CHAP. XXVI.—MUCILAGES.

MUCILAGO ACACIÆ ARABICÆ. *Ed.*
Mucilage of Gum Arabic.

Take of
Gum arabic, in powder, one part;
Boiling water, two parts.
Digest with frequent agitation until the gum be dissolved; then press the mucilage through linen.

MUCILAGO ACACIÆ. *Lond.*
Mucilage of Acacia.

Take of
Gum arabic in powder, four ounces;
Boiling water, half a pint.
Triturate the gum with the water, gradually added, until it be dissolved.

MUCILAGO GUMMI ARABICI. *Dub.*
Mucilage of Gum Arabic.

Take of
Gum arabic, in coarse powder, four ounces;
Boiling water, eight ounces, by measure.
Digest with frequent agitation till the gum be dissolved, then strain the mucilage through linen.

Gum Arabic is a substance so easily altered by heat, that it is changed even by boiling water poured upon it, and by being powdered. To prepare very fine mucilage, we must suspend the pieces of gum entire, tied up in a muslin rag, merely immersed in the water. As fast as it dissolves, the heavy mucilage sinks to the bottom, and fresh water comes in contact with the gum until the whole be dissolved. Prepared according to the directions of the colleges, mucilage is always more or less turbid, and has an acid smell.

Mucilage of gum arabic is very useful in many operations in pharmacy; it is also much used for properties peculiar to substances of its own class; and of all the gums, it seems to be the purest.

DECOCTUM ALTHÆÆ OFFICINALIS. *Ed.*

Decoction of Marshmallows.

Take of
  Dried marshmallow roots, bruised, four ounces;
  Raisins, stoned, two ounces;
  Water, seven pounds.

Boil down to five pounds; strain the decoction, and after the fæces have subsided, pour off the liquor.

Marshmallow roots abound with mucilage. This decoction is therefore to be considered merely as an emollient, rendered more pleasant by the acidulous sweetness of the raisins.

MUCILAGO AMYLI. *Dub.*

Mucilage of Starch.

Take of
  Starch, half an ounce;
  Water, one pint.

Triturate the starch, gradually adding the water; then boil them a little.

Ed. Lond.

Take of
  Starch, three drachms;
  Water, one pint.

Triturate the starch with the water, gradually added, and boil till it become a mucilage.

The mucilage thus formed is very useful in those cases where a glutinous substance is required; it is often successfully employed as a glyster, in diarrhœas depending on acrimony in the intestines.

MUCILAGO ASTRAGALI TRAGACANTHÆ. *Ed.*
Mucilage of Gum Tragacanth.

Take of
Gum tragacanth, in powder, two drachms;
Boiling water, eight ounces.
Macerate for twenty-four hours, then triturate carefully, that the gum may be dissolved; and press the mucilage through a linen cloth.

MUCILAGO GUMMI TRAGACANTHÆ. *Dub.*
Mucilage of Gum Tragacanth.

Take of
Gum tragacanth, in powder, two drachms;
Water, eight ounces, by measure.
Macerate in a close vessel, till the gum be dissolved; then strain the mucilage through linen.

GUM tragacanth is difficultly soluble in water. When macerated in it, it swells, but does not dissolve. To effect the solution, it must be beaten into a paste with some of the water, and the rest of the water must be added gradually, and incorporated with the paste, by beating them together. Gum tragacanth is a very tenacious substance, and requires a very large proportion of water to form a fluid mucilage.

DECOCTUM CYDONIÆ. *Lond.*
Decoction of Quince-seed.

Take of
Quince-seeds, two drachms;
Water, one pint.
Boil, with a slow fire, for ten minutes, and strain.

THIS mucilage, though sufficiently agreeable, is perfectly superfluous, especially as it is apt to spoil, from being mixed with the other principles of the seeds soluble in water. It is, besides, never so transparent as mucilage carefully prepared from gum arabic, is not cheaper, and is unfit for many purposes, being coagulated by acids.

Decoctum hordei distichi. *Ed.*
Decoctum hordei. *Dub.*
Decoction of Barley. Barley Water.

Take of
Pearl barley, two ounces;
Water, five pounds.

First wash off the mealy matter which adheres to the barley with some cold water; then extract the colouring matter, by boiling it a little, with about half a pint of water. Throw this decoction away, and put the barley thus purified into five pints of boiling water, which is to be boiled down to one half, and strain the decoction.

Decoctum hordei. *Lond.*
Decoction of Barley.

Take of
Pearl barley, two ounces;
Water, four pints and a half.

First wash off all foreign matters from the barley with cold water; then add half a pint of the water, and boil a little. Throw this water away, and pour on the remaining water boiling hot; boil down to two pints, and strain.

Decoctum hordei compositum. *Dub.*
Compound Decoction of Barley.

Take of
The decoction of barley, four pints;
Raisins, stoned, two ounces;
Figs, sliced, two ounces;
Liquorice root, sliced aud bruised, half an ounce.

During the boiling, add first the raisins, and then the figs, and lastly the liquorice, a short time before it is finished, when the strained decoction ought to measure two pints.

Lond.

Take of
Decoction of barley, two pints;
Figs, sliced, two ounces;
Liquorice root, sliced and bruised, half an ounce;
Raisins, stoned, two ounces;
Water, one pint.

Boil down to two pints, and strain.

These liquors are to be used freely, as diluting drinks, n fevers and other acute disorders; hence it is of consequence that they should be prepared so as to be as elegant and agreeable as possible: for this reason they are inserted in the Pharmacopœia, and the several circumstances which contribute to their elegance set down; for if any one of them be omitted, the beverage will be less grateful. As, however, they are much oftener prepared by nurses and servants than by the apothecary, these receipts might, with great advantage, be substituted for the ridiculous, and often dangerous, specifics with which domestic cookery books abound. However trivial medicines of this class may appear to be, they are of greater importance in the cure of acute diseases than many more elaborate preparations.

DECOCTUM LICHENIS ISLANDICI. *Ed.*
Decoction of Iceland Moss.

Take of
  Iceland moss, one ounce;
  Water, two pounds.
Boil down to sixteen ounces, and strain.

Dub.

Take of
  Iceland moss, half an ounce;
  Boiling water, a pint.
Digest for two hours in a close vessel; then boil for a quarter of an hour, and strain the liquor while hot.

DECOCTUM LICHENIS. *Lond.*
Decoction of Iceland Moss.

Take of
  Iceland moss, one ounce;
  Water, a pint and a half.
Boil to a pint, and strain.

I HAVE already given my opinion of the nature and effects of this mucilage. As in the present preparation the bitter principle is not removed, it may have some action as a tonic; but it renders it at the same time too nauseous to be used in sufficient quantity to have much effect as an article of diet.

CHAP. XXVII.—SYRUPS.

SYRUPI. *Dub.*
Syrups.

IN making syrups, where neither the weight of the sugar, nor the manner in which it should be dissolved are directed, the following rule is to be followed:

Take of
Double refined sugar, in fine powder, twenty-nine ounces;
The liquor prescribed, one pint.

Gradually add the sugar, and digest with frequent agitation, in a close vessel, and in a moderate heat, until it be dissolved; then set it aside for twenty-four hours; take off the scum, and pour off the syrup from the fæces, if there be any.

Lond.

Syrups are to be kept in a place whose temperature never exceeds 50° Fahr.

SYRUPS are solutions of sugar in any watery fluid, whether simple or medicated. Simple syrup is nutritious and demulcent. When made of fine sugar, it is transparent and colourless. If necessary, it is easily clarified, by beating to a froth the white of an egg, with three or four ounces of water, mixing it with the syrup, and boiling the mixture for a few seconds, until the albumen coagulates, and enveloping all heterogeneous matters, forms a scum, which may be easily taken off, or separated by filtration. When, instead of simple water, any other fluid is used for dissolving the sugar, the syrup is then said to be medicated. Medicated syrups are prepared with expressed juices, infusions, decoctions, or saline fluids. The object of forming these into syrups is either to render them agreeable to the palate, or to preserve them from fermentation. In the latter case, the quantity of sugar added becomes a matter of great importance; for, if too much be employed, the sugar will separate by crystallization; and, if too little, instead of preventing fermentation, it will accelerate it. About two parts of sugar to one of fluid are the proportions directed by the British Colleges with this view. But, as in some instances a larger quantity of fluid is added, and afterwards reduced to the proper quantity by decoction, it will not be superfluous to point out some circumstances, which shew the evaporation to be carried far enough. These are the tendency to form a pellicle on its surface, when a drop of it is allowed to cool: the receding of the last portion of each drop, when poured out drop by drop, after it is cold; and what is most to be relied on, its specific gravity being about 1.3, when boiling hot, or 1.385, when cold. The syrup which remains, after all the crystallizable sugar has been separated from it, has been much, and probably justly, recommended by some for the preparation of medicated syrups and electuaries, although its pharmaceutical superiority is actually owing to its impurity.

SYRUPUS SIMPLEX. *Ed.*
Simple Syrup.

Take of
Refined sugar, fifteen parts;
Water, eight parts.
Let the sugar be dissolved by a gentle heat in the water, and boiled a little so as to form a syrup.

Lond.

Take of
Refined sugar, two pounds and a half;
Water, one pint.
Dissolve the sugar in the water, in a water-bath; let it stand for twenty-four hours, then skim it, and decant off the pure syrup from the fæces, if there be any.

SIMPLE syrup should have neither flavour nor colour, and is more convenient in extemporaneous prescription than sugar undissolved.

SYRUPUS ALTHÆÆ OFFICINALIS. *Ed.*
Syrup of Marshmallow.

Take of
Fresh marshmallow roots, sliced, one part;
Water, ten parts;
Refined sugar, four parts.
Boil the water with the roots, down to one-half, and strain the liquor, with strong expression. Set aside the strained decoction till the fæces have subsided; add the sugar to the depurated decoction, and boil so as to make a syrup.

SYRUPUS ALTHÆÆ. *Lond.*
Syrup of Marshmallow.

Take of
Fresh root of marshmallow, bruised, half a pound;
Refined sugar, two pounds;
Water, four pints.

Boil the water with the marshmallow root to one-half, and press out the liquor when cold. Set it at rest for twenty-four hours; and after the fæces have subsided, pour off the decoction. Add the sugar, and boil it to the proper consistence.

THIS is merely a mucilaginous syrup, and is chiefly used in nephritic cases, and for sweetening emollient decoctions.

SYRUPUS CITRI AURANTII. *Ed.*
Syrup of Orange-peel.

Take of
The fresh outer rind of Seville oranges, three ounces;
Boiling water, one pound and a half;
Refined sugar, three pounds.

Macerate the rind in the water for twelve hours in a covered vessel; then add to the filtered liquor the sugar, in powder, and, with a gentle heat, form a syrup.

SYRUPUS AURANTII. *Dub.*
Syrup of Orange-peel.

Take of
Fresh outer rind of Seville oranges, eight ounces;
Boiling water, six pints.

Macerate for twelve hours, in a close vessel; and, in the strained liquor, dissolve refined sugar to make a syrup.

SYRUPUS AURANTIORUM. *Lond.*
Orange Syrup.

Take of
Fresh orange rind, two ounces;
Boiling water, one pint;
Refined sugar, three pounds.

Macerate the rind in the water, in a loosely covered vessel, for twelve hours; then pour off the liquor, and add to it the sugar.

IN making this syrup, it is particularly necessary that the sugar be previously powdered, and dissolved in the infusion, with as gentle a heat as possible, to prevent the exhalation of the volatile parts of the peel. With these cautions, the syrup proves a very elegant and agreeable one, possessing a great share of the fine flavour of the orange-peel.

SYRUPUS DIANTHI CARYOPHYLLI. *Ed.*
Syrup of Clove July-flower.

Take of
- Clove July-flowers, fresh gathered and freed from the heels, one part;
- Boiling water, four parts;
- Refined sugar, seven parts.

Macerate the petals in the water for twelve hours; and dissolve in the filtered infusion the sugar in powder, by a gentle heat, so as to form a syrup.

SYRUPUS CARYOPHYLLI RUBRI. *Dub.*
Syrup of Clove July-flower.

Take of
- The petals of fresh clove July-flowers, without the heels, two pounds;
- Boiling water, six pints.

Macerate for twelve hours in a glass vessel; and in the strained liquor dissolve refined sugar, so as to form a syrup.

As the beauty of the colour is principally attended to in this syrup, no force should be used in expressing the infusion from the flowers. It is rarely prepared from the petals alone, and there is often substituted for it one easily prepared at all seasons: An ounce of spice-cloves is infused for some days in twelve ounces of white wine, the liquor strained, and, with the addition of twenty ounces of sugar, boiled to the proper consistence of a syrup, to which a little cochineal gives a colour exactly similar to that prepared from the clove July-flower; and its flavour is of the same kind, though not so pleasant. The counterfeit may be readily detected, by adding to a little of the syrup, some alkaline salt or ley, which will change the genuine syrup to a green colour; but, in the counterfeit, it will make no such alteration, only varying the shade of the red.

SYRUPUS CROCI. *Lond.*
Syrup of Saffron.

Take of
- Saffron, one ounce;
- Boiling water, one pint;

Refined sugar, two pounds and a half.

Macerate the saffron in the water for twelve hours, in a loosely covered vessel; and dissolve the sugar in the strained liquor.

Saffron is very well fitted for making a syrup. It is said to be a pleasant cordial, and gives a fine colour to juleps.

Syrupus sarsaparillæ. *Lond.*
Syrup of Sarsaparilla.

Take of
Sarsaparilla root, sliced, one pound;
Boiling water, one gallon;
Refined sugar, one pound.

Macerate the root in the water for twenty-four hours; then boil down to four pints, and filter the liquor while still hot; then add the sugar, and evaporate to the proper consistence.

This is a new syrup, for which I apprehend we are more indebted to fashion than to observation. I am unacquainted with its use. Mr Phillips says it is employed as an adjunct to the decoction of sarsaparilla; but from Mr Brande we learn that it is a convenient and portable form for the administration of sarsaparilla, is not liable to ferment, and is not disagreeable when diluted with water; that it has lately been much prescribed, and hence, probably, its introduction into the Pharmacopœia; that it is improved by the addition of a few cloves, and may be taken as an alterative in the dose of a desert spoonful three or four times a-day, and that the sugar is very apt to disagree with some stomachs.

Syrupus toluiferæ balsami. *Ed.*
Syrup of Balsam of Tolu.

Take of
Common syrup, two pounds;
Tincture of balsam of Tolu, one ounce.

With the syrup just prepared, and when it has almost grown cold, after having been removed from the fire, gradually mix the tincture with constant agitation.

Syrupus tolutanus. *Lond.*
Syrup of Tolu.

Take of
The balsam of Tolu, one ounce;

Boiling water, one pint;
Refined sugar, two pounds.

Boil the balsam in the water for half an hour in a covered vessel, stirring it occasionally; strain the liquor when cold, and add the sugar as in making simple syrup.

The intention of the contrivers of the two foregoing processes seems to have been somewhat different. In the latter, which is certainly the most elegant, the benzoic acid of the balsam alone is contained, and the syrup is clear and colourless; the other syrup contains the whole substance of the balsam in larger quantity, and is white and opaque. They are both moderately impregnated with the agreeable flavour of the balsam.

SYRUPUS VIOLÆ ODORATÆ. *Ed.*
Syrup of Violets.

Take of
Fresh violets, two parts;
Boiling water, eight parts;
Refined sugar, fifteen parts.

Macerate the violets in the water, for twenty-four hours, in a covered glass or glazed earthen vessel; then strain without expression, and to the strained infusion add the sugar.

SYRUPUS VIOLÆ. *Dub.*
Syrup of Violets.

Take of
The fresh petals of the violet, two pounds;
Boiling water, five pints.

Macerate for twenty-four hours; afterwards strain the liquor, without expression, through thin linen. Add double refined sugar, that it may be made a syrup.

This syrup has a very agreeable flavour; and, in the quantity of a spoonful or two, proves to children gently laxative, probably from the small quantity of emetine it contains. It is apt to lose, in keeping, the elegant blue colour, for which it is chiefly valued; and hence some have been induced to counterfeit it, with materials whose colour is more permanent, and which are more easily obtained. If the syrup be genuine, acids will change it red, and alkalies green; but if counterfeit, these changes will not happen; and a prescriber would be deceived, if he should expect, by means of it, to give a red tinge to acidulated, or blue to alkalized juleps or mixtures. From this mutability of colour, the true syrup of violet forms an excellent test of the presence of acids and alkalies.

SYRUPUS AMOMI ZINGIBERIS. *Ed.*
Syrup of Ginger.

Take of
Ginger root, in powder, six drachms;
Boiling water, one pound;
Refined sugar, twenty-two ounces.
Macerate the ginger in the water, in a close vessel, for twenty-four hours; strain the infusion, add the sugar, and dissolve it with a gentle heat.

SYRUPUS ZINGIBERIS. *Dub.*
Syrup of Ginger.

Take of
Ginger, bruised, four ounces;
Boiling water, three pints.
Macerate for twenty-four hours, and strain; then add the refined sugar, and make into a syrup.

Lond.

Take of
Ginger, sliced, two ounces;
Boiling water, one pint;
Refined sugar, two pounds.
Macerate the ginger in the water for four hours, and strain; then add the sugar as directed for making syrup.

THIS is an agreeable and moderately aromatic syrup, impregnated with the flavour and virtues of the ginger.

SYRUPUS ROSÆ GALLICÆ. *Ed.*
Syrup of Red Roses.

Take of
The dried petals of red roses, one part;
Refined sugar, two parts;
Boiling water, nine parts.
Macerate the rose leaves in the water, for twelve hours; then boil a little, and strain the liquor; add to it the sugar, and boil again for a little, so as to form a syrup.

THIS syrup is supposed to be mildly astringent, but is principally valued on account of its red colour.

SYRUPUS ROSÆ CENTIFOLIÆ. *Ed.*

Syrup of Hundred-leaved Rose.

Take of

The fresh petals of the hundred-leaved rose, one part;
Boiling water, four parts;
Refined sugar, three parts.

Macerate the petals in the water for twelve hours; then to the strained infusion add the sugar, and boil them into a syrup.

SYRUPUS ROSÆ. *Lond.*

Syrup of Roses.

Take of

The dried petals of the hundred-leaved rose, seven ounces;
Refined sugar, six pounds;
Boiling water, four pints.

Macerate the rose leaves in the water for twelve hours, and strain. Evaporate the strained liquor, in a water-bath, to two pints and a half, and add the sugar, as directed for making syrup.

THIS syrup is an agreeable and mild purgative for children, in the dose of half a spoonful, or a spoonful. It likewise proves gently laxative to adults; and with this intention may be of service in costive habits.

SYRUPUS CASSIÆ SENNÆ. *Ed.*

Syrup of Senna.

Take of

Senna leaves, two ounces;
Boiling water, a pound and a half;
Molasses, eight ounces.

Macerate the leaves in the water in a slightly covered vessel for four hours, and strain; then add the syrup, and boil with a gentle heat to the thickness of the molasses.

SYRUPUS SENNÆ. *Dub.*

Syrup of Senna.

Take of

Manna,
Refined sugar, each one pound;
Senna, half an ounce;
Boiling water, a pint.

Macerate the senna in the water, in a covered vessel, for twelve hours; then, with the strained liquor, mix the manna and the sugar, so that they may be dissolved.

Lond.

ake of
Senna leaves, two ounces;
Fennel seeds, bruised, one ounce;
Manna, three ounces;
Refined sugar, one pound;
Boiling water, a pint.

acerate with a gentle heat the senna leaves and fennel seeds in the water for one hour. Strain the liquor, and mix with it the manna and sugar, then boil to a proper thickness.

This preparation, which is intended to be an officinal sub-itute for an excellent nursery purgative, is a proof of the propriety of colleges sanctioning prescriptions which they ave not brought to the test of experiment. Mr Phillips und, that the proportions as given by the Dublin College elded, instead of a fluid syrup, a substance so thick, that it uld not even be shaked out of an inverted vessel, owing to e crystallization of the manna. Even in the receipt of the ondon College, the manna separates by crystallization. reacle is the best addition for forming infusion of senna to a syrup, as it has no tendency to crystallize, and covers s taste so completely, that children take it readily.

Syrupus rhamni. *Lond.*
Syrup of Buckthorn.

ake of
The fresh juice of buckthorn berries, four pints;
Ginger, sliced,
Pimento berries, powdered, of each, half an ounce;
Refined sugar, three pounds and a half.

et aside the juice for three days that the fæces may subside, and then strain it. To one pint of the defæcated juice, add the ginger and pimento; then macerate with a gentle heat for four hours, and filter. Boil away the rest of the juice to one pint and a half; mix the liquors, and add the sugar as directed for making syrup.

This preparation, in doses of three or four spoonfuls, erates as a brisk cathartic. The principal inconveniences tending it are, its being very unpleasant, and its occasioning irst and dryness of the mouth and fauces, and sometimes olent gripes; these effects may be prevented by drinking erally water gruel, or other warm liquids during the operation.

SYRUPUS CITRI MEDICI. *Ed.*
Syrup of Lemons.

Take of
Juice of lemons, filtered after the fæces have subsided, three parts;
Refined sugar, five parts.
Dissolve the sugar.

SYRUPUS LIMONIS. *Dub.*
Syrup of Lemons.

Take of
Strained lemon juice, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the lemon juice, as directed for syrup.

SYRUPUS LIMONUM. *Lond.*
Lemon Syrup.

Take of
Lemon juice, strained, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the lemon juice, in the same manner as directed for the formation of simple syrup.

SYRUPUS MORI. *Lond.*
Syrup of Mulberry.

Take of
Mulberry juice, strained, one pint;
Refined sugar, two pounds.
Dissolve the sugar in the mulberry juice, as directed for simple syrup.

THESE are very pleasant cooling syrups; and with this intention they are occasionally used in draughts and juleps, for quenching thirst, abating heat, &c. in bilious or inflammatory distempers. They are sometimes likewise employed in gargarisms for inflammations of the mouth and tonsils.

SYRUPUS ACETI. *Ed.*
Syrup of Vinegar.

Take of
Vinegar, five parts;
Refined sugar, seven parts.
Boil them, so as to form a syrup.

THIS is to be considered as simple syrup merely acidulated, and is by no means unpleasant. It is employed in mucilagious mixtures, and the like; and, on account of its cheapess, it is often preferred to syrup of lemons.

SYRUPUS ALLII. *Dub.*

Syrup of Garlic.

ake of

Garlic, sliced, one pound;
Boiling water, two pints.

acerate the garlic in the water, in a covered vessel, for twelve hours; then add the sugar to the strained liquor, and form a syrup.

THIS is a very disagreeable syrup; but when we wish to xtract the virtues of garlic by a watery menstruum, it is the est means we can employ.

SYRUPUS SCILLÆ MARITIMÆ. *Ed.*

Syrup of Squills.

ake of

Vinegar of squills, four parts;
Refined sugar, in powder, seven parts.

issolve the sugar with a gentle heat, so as to form a syrup.

THIS syrup is used chiefly in doses of a spoonful or two, r promoting expectoration, which it does very powerfully. is also given as an emetic to children.

SYRUPUS COLCHICI AUTUMNALIS. *Ed.*

Syrup of Colchicum.

ake of

Colchicum root, fresh, cut into thin slices, one ounce;
Vinegar, sixteen ounces;
Refined sugar, twenty-six ounces.

acerate the root in the vinegar for two days, occasionally shaking the vessel; then strain the infusion with gentle expression. To the strained infusion add the sugar, and boil a little, so as to form a syrup.

THIS syrup seems to be one of the best preparations of the olchicum. We must take care to gather the root in the roper season; and, from errors in this respect, we are to scribe the uncertainty in the effects of this medicine as found the shops.

It was chiefly employed as a diuretic, and may be taken om a drachm or two to the extent of an ounce or more.

SYRUPUS PAPAVERIS SOMNIFERI. *Ed.*

Syrup of White Poppy.

Take of

White poppy-heads, dried, and freed from the seeds, one part;
Boiling water, fifteen parts;
Refined sugar, two parts.

Macerate the sliced heads in the water for twelve hours; boil the infusion till only one-third part of the liquor remain; then strain the decoction with strong expression. Boil the strained decoction to one-half, and strain again; lastly, add the sugar, and boil a little, so as to form a syrup.

SYRUPUS PAPAVERIS. *Lond.*

Syrup of Poppy.

Take of

The heads of white poppies, dried and bruised, without the seeds, fourteen ounces;
Refined sugar, two pounds;
Boiling water, two gallons and a half.

Macerate the capsules in the water for twenty-four hours; boil them to one gallon in a water-bath, and strongly press out the decoction. Boil this down, after being strained, to two pints, and strain it while hot; set it aside for twelve hours that the fæces may subside. Boil the liquor, poured off from the fæces, to one pint, and dissolve the sugar in it, in the manner directed for making syrup.

SYRUPUS PAPAVERIS ALBI. *Dub.*

Syrup of White Poppy.

Take of

White poppy-heads, gathered unripe, dried, and emptied of their seeds, one pound;
Boiling water, three pints.

Slice and bruise the heads, then pour on the water, and macerate for twelve hours; express the liquor, and evaporate in a moderate heat to one pint; strain through thin flannel, and set aside for six hours, to allow the fæces to subside; to the decanted liquor add the sugar, and make into a syrup.

THIS syrup, impregnated with the narcotic matter of the poppy-heads, is given to children, in doses of two or three drachms, and to adults, of half an ounce to an ounce and upwards, for easing pain, procuring rest, and answering the other intentions of mild opiates. Particular care is requisite in its preparation, that it may be always made, as nearly as possible, of the same strength; and accordingly the colleges have been very minute in their descriptions of the process, although, Mr Phillips justly remarks, the use of a water-bath in forming the decoction, as directed by the London College, is unnecessary.

SYRUPUS OPII. *Dub.*
Syrup of Opium.

Take of
Watery extract of opium, eighteen grains;
Boiling water, eight ounces by measure.
Macerate until the opium be dissolved, then add sugar so as to make a syrup.

THIS syrup is an elegant substitute for the former. It is made with infinitely less trouble, and is always of an uniform strength. Eight fluidounces of water require about 15 ounces of sugar to make a syrup, which measures about 18 fluidounces; and therefore the syrup contains about a grain of extract of opium in the fluidounce.

SYRUPUS PAPAVERIS ERRATICI. *Dub.*
Syrup of Red Poppy.

Take of
The fresh petals of the red poppy, one pound;
Boiling water, twenty ounces by measure.
Put the flowers by degrees into the boiling water. After this, the vessel being removed from the fire, and taken out of the bath, macerate for twelve hours; then press out the liquor, and set it apart, that the fæces may subside. Lastly, make it into a syrup with refined sugar.

SYRUPUS RHŒADOS. *Lond.*
Syrup of Red Poppy.

Take of
Fresh petals of red poppy, one pound;
Boiling water, one pint and two fluidounces;
Refined sugar, two pounds and a half.
Gradually put the petals into the water, heated in a water-bath, stirring it occasionally; then having removed the vessel from the fire, macerate for twelve hours; express the liquor, and set it aside to let the impurities settle at the bottom: then add the sugar, as directed for syrup.

The design of putting the flowers into boiling water in a water-bath is that they may be a little scalded, so as to shrink enough to be all immerged in the water: without this precaution they can scarcely be all got in; but they are to be continued no longer over the fire than till this effect is produced, lest the liquor become too thick, and the syrup be rendered ropy.

As a medicine it is perfectly insignificant, although considered anodyne.

CHAP. XXVIII.—MEDICATED HONEYS.

MEL DESPUMATUM. *Dub. Lond. Ed.*
Clarified Honey.

Melt the honey in a water bath, and remove the scum as it rises.

In this simple process, the honey is rendered so liquid by the heat of the boiling water, that the wax and other lighter impurities which it commonly contains rise to the surface, in the form of a scum, which is easily removed. At the same time, sand or any heavy mixture of that kind sinks to the bottom.

Honey was supposed to be peculiarly balsamic, and was therefore at one time much used in pharmacy. But as its saccharine matter is absolutely of the same nature with that of sugar, and as the extraneous matters which it always contains make it disagree with the stomachs of many individuals, the number of medicated honeys has been much diminished, and their place in some instances supplied by syrups. Medicated honeys are known to be of a proper consistence, by allowing a small quantity to cool on a plate, if, when divided by the edge of a spoon, the portions do not immediately reunite, or if the specific gravity be 1.26 when hot, or 1.31 when cold.

OXYMEL. *Dub.*
Oxymel.

Take of
  Honey, two pounds;
  Distilled vinegar, one pint.

Boil in a glass vessel, with a gentle fire, to the consistency of a syrup, skimming it.

Ed.

Take of
Clarified honey, three parts;
Distilled vinegar, two parts;
Boil down in a glass vessel, with a gentle fire, to a proper thickness.

OXYMEL SIMPLEX. *Lond.*

Simple Oxymel.

Take of
Clarified honey, two pounds;
Dilute acetic acid, one pint.
Boil down with a gentle fire, in a glass vessel, to the proper thickness.

THIS syrup is a favourite and useful domestic remedy in colds, and slight sore throats.

MEL SUBBORATIS SODÆ. *Ed.* MEL BORACIS. *Lond.*

Honey of Borax.

Take of
Subborate of soda, powdered, one drachm, (one part, *Ed.)*
Clarified honey, an ounce, (eight parts, *Ed.)*
Mix them.

THIS is much employed as a detergent in aphthæ and ulcers of the mouth.

OXYMEL COLCHICI. *Dub.*

Oxymel of Meadow Saffron.

Take of
The fresh root of meadow saffron, cut into thin slices, one ounce;
Distilled vinegar, one pint;
Clarified honey, two pounds, by weight.
Macerate the root of meadow saffron with the vinegar, in a glass vessel, with a gentle heat, for forty-eight hours. Strain the liquor, pressed out strongly from the root, and add the honey. Lastly, boil the mixture, frequently stirring it with a wooden spoon, to the thickness of a syrup.

THIS is an active preparation, but its use has been superseded by other preparations.

MEL ROSÆ GALLICÆ. *Ed.*
Honey of Red Roses.

Take of
- Red rose leaves, dried, one ounce;
- Boiling water, one pound;
- Clarified honey, sixteen ounces.

Macerate the petals for six hours in the water, add the honey to the filtered liquor, and boil down to the proper thickness.

MEL ROSÆ. *Dub.*
Honey of Roses.

Take of
- The petals of red rose buds, previously dried, with the heels cut off, four ounces;
- Boiling water, three pints;
- Honey, five pounds.

Macerate the rose leaves in the water for six hours; then mix the honey with the strained liquor, and boil the mixture to the thickness of a syrup, removing the scum.

Lond.

Take of
- Red rose petals, dried, four ounces;
- Boiling water, three pints;
- Clarified honey, five pounds.

Macerate the petals in the water for six hours; then add the honey to the filtered liquor, and boil down to a proper consistence in a water-bath.

THIS preparation is not unfrequently used in gargles for ulcerations and inflammation of the mouth and tonsils.

The Dublin College, in making this and some similar preparations, used unclarified honey, with the idea, probably, that it may be equally well clarified in the course of the preparation itself. This is no doubt true; but as we do not know what effect the clarification may have on the active substances added to the honey, we think that the use of clarified honey as directed by the London College is preferable.

OXYMEL SCILLÆ. *Lond. Dub.*
Oxymel of Squills.

Take of
- Clarified honey, three pounds;
- Vinegar of squills, two pints.

Boil them in a glass vessel, with a slow fire, to the thickness of a syrup, (the proper thickness, *Lond.)*

Oxymel of squills is a useful aperient, detergent, and expectorant, and of great service in humoral asthmas, coughs, and other disorders where thick phlegm abounds. It is given in doses of two or three drachms, along with some aromatic water, as that of cinnamon, to prevent the great nausea which it would otherwise be apt to excite. In large doses it proves emetic.

OXYMEL ÆRUGINIS. *Dub.*
Oxymel of Verdegris.
LINIMENTUM ÆRUGINIS. *Lond.*
Liniment of Verdegris.

Take of

Prepared verdegris, one ounce;
Vinegar, seven ounces, by measure;
Clarified honey, fourteen ounces, by weight.

Dissolve the verdegris, in the vinegar, and strain it through linen; then add the honey, and boil the whole to a proper thickness.

This is the old *Mel Ægyptiacum*, and is a very useful stimulant and gentle escharotic. When properly diluted with water, this preparation has been recommended in venereal ulcerations of the mouth and tonsils. Externally it is applied, mixed with any digestive ointment, to destroy fungous flesh, and to excite unhealthy ulcers. It is a domestic remedy against suppurated chilblains.

CHAP. XXIX.

EMULSIONS AND MIXTURES.

In this chapter we comprehend those compositions in which oils, and other substances, insoluble in water, are mixed with, and suspended in watery fluids, by means of viscid substances, such as mucilage and syrups.

MISTURA AMYGDALARUM. *Lond.*
Almond Mixture.

Take of
Almond confection, two ounces;
Distilled water, one pint.

Triturate the confection with the water gradually added to it, until they mix; then strain.

LAC AMYGDALÆ. *Dub.*
Almond Milk.

Take of
Sweet almonds, blanched, an ounce and a half;
Refined sugar, half an ounce;
Water, two pints and a half.

Triturate the almonds with the sugar, adding the water by degrees, and strain.

EMULSIO AMYGDALI COMMUNIS. *Ed.*
Almond Emulsion.

Take of
Sweet almonds, one ounce;
Refined sugar, half an ounce;
Water, two pounds and a half.

Blanch the almonds by steeping them for a little in hot water, and peeling them; then beat them diligently with the sugar in a stone mortar, gradually pouring on the water, and strain the liquor.

EMULSIO ACACIÆ ARABICÆ. *Ed.*
Arabic Emulsion.

Take of
Mucilage of gum arabic, two ounces;
Almonds, one ounce;
Refined sugar, half an ounce;
Water, two pounds and a half.

Blanch the almonds, by steeping them in hot water, and peeling them; then beat them diligently in a stone mortar, first with the sugar, and then with the mucilage, gradually adding the water afterwards; lastly, strain through linen.

EMULSIO ARABICA. *Dub.*
Arabic Emulsion.

Take of
Gum arabic, in powder, two drachms;
Sweet almonds, blanched,

Refined sugar, each half a drachm;
Decoction of barley, one pint.

Dissolve the gum in the warm decoction, and when it is almost cold, pour it upon the almonds, previously well beaten with the sugar, and at the same time triturate them together so as to form an emulsion, and then filter.

All these emulsions may be considered as possessing nearly the same qualities. When made without addition, they may truly be considered as a vegetable milk, as they consist of a bland oil mixed with water, by means of vegetable albumen, and like milk they separate by rest. On standing for some days, the oily matter rises to the top, like thick cream. By heat the same decomposition is immediately effected, and with the addition of a little acid, such as cream of tartar, the albuminous curd may be separated, and an elegant almond whey prepared. The addition of the sugar, gum arabic and barley in the compound emulsion renders them more viscid and demulcent.

Great care should be taken that the almonds have not become rancid by keeping, which not only renders the emulsion extremely unpleasant, a circumstance of great consequence in a medicine that requires to be taken in large quantities, but likewise gives it injurious qualities.

The almonds are blanched by infusing them in boiling water, and peeling them. The success of the preparation depends upon beating the almonds to a smooth pulp, and triturating them with each portion of the watery fluid, so as to form an uniform mixture before another portion be added. The use of the almond confection directed by the London College is very convenient.

These liquors are principally used for diluting and correcting acrimonious humours; particularly in heat of urine and stranguries, arising either from a natural acrimony of the juices, or from the operation of cantharides, and other irritating medicines. In these cases, they are to be drunk frequently, to the quantity of half a pint or more at a time.

EMULSIO CAMPHORÆ. *Ed.*
Camphor Emulsion.

Take of
Camphor, one scruple;
Sweet almonds,
Refined sugar, of each, half an ounce;
Water, a pound and a half.

Beat the blanched almonds in a stone mortar, with the camphor and sugar previously well rubbed together, gradually adding the water, and then strain.

MISTURA CAMPHORÆ. *Lond.*
Camphor Mixture.

Take of
Camphor, half a drachm;
Rectified spirit, ten minims;
Water, one pint.

First triturate the camphor with the spirit, then with the water gradually poured upon it, and strain.

MISTURA CAMPHORATA. *Dub.*
Camphorated Mixture.

Take of
Camphor, one scruple;
Rectified spirit of wine, ten drops;
Refined sugar, half an ounce;
Water, one pint.

Rub the camphor first with the spirit of wine, then with the sugar; lastly, add the water, by degrees, during the trituration, and strain the mixture through linen.

NEITHER of these mixtures are very permanent, as the camphor separates, and swims upon the surface in the course of a few days. Camphor is best suspended by triturating it with magnesia, or with genuine wheat starch: potatoe starch does not answer so well. (See page 219.) These mixtures are very convenient modes of exhibiting camphor, and may be given to the extent of a table spoonful every three or four hours in typhoid fevers.

LAC AMMONIACI. *Dub.*
Emulsion of Gum Ammoniac.

Take of
Gum ammoniac, one drachm;
Pennyroyal water, eight ounces, by measure.

Rub the gum resin with the pennyroyal water, gradually poured on, until the mixture acquire a milky appearance. It is then to be poured through linen.

MISTURA AMMONIACI. *Lond.*
Mixture of Ammoniac.

Take of
Ammoniac, two drachms;
Water, half a pint.

Triturate the ammoniac with the water, gradually added to it, until they are thoroughly mixed.

The lac ammoniaci is employed for attenuating tough phlegm, and promoting expectoration in humoral asthmas, coughs, and obstructions of the viscera. It may be given to the quantity of two spoonfuls twice a-day.

LAC ASSÆFŒTIDÆ. *Dub.*
Emulsion of Assafœtida.

Take of
  Assafœtida, one drachm;
  Pennyroyal water, eight ounces, by measure.
Triturate the assafœtida with the water, gradually added to it, until it form an emulsion.

MISTURA ASSAFŒTIDÆ. *Lond.*
Mixture of Assafœtida.

Take of
  Assafœtida, two drachms;
  Water, half a pint.
Triturate the assafœtida with the water, gradually added to it, until they become thoroughly mixed.

The assafœtida emulsion answers the same purposes as assafœtida in substance, and on some occasions is a more convenient, though very disagreeable mode of exhibiting it.

MISTURA GUAIACI. *Lond.*
Guaiac Mixture.

Take of
  Guaiac gum resin, one drachm and a half;
  Refined sugar, two drachms;
  Mucilage of gum arabic, two fluidrachms;
  Cinnamon water, eight fluidounces.
Triturate the guaiac with the sugar, then with the mucilage, and during the trituration with these, gradually add the cinnamon water.

Gum Arabic has a chemical action upon guaiac, by which it readily forms an emulsion with water, so that in this mixture it is combined, and not merely suspended by the viscidity given by the mucilage and sugar. This, therefore, is not one of the best forms of exhibiting guaiac.

MISTURA MOSCHI. *Lond.*
Musk Mixture.

Take of
- Musk,
- Gum arabic, powdered,
- Refined sugar, of each one drachm;
- Rose water, six fluidounces.

Rub the musk first with the sugar, then with the gum, and add the rose water by degrees.

UNLESS the musk be very thoroughly triturated with the sugar and gum before the addition of the water, it is said to separate soon. An ounce, or an ounce and a half, may be taken for a dose.

POTIO CARBONATIS CALCIS. *Ed.*
Potion of Carbonate of Lime.

Take of
- Prepared carbonate of lime, one ounce;
- Refined sugar, half an ounce;
- Mucilage of gum arabic, two ounces.

Triturate together, and then gradually add, of
- Water, two pounds and a half;
- Spirit of cinnamon, two ounces.

MISTURA CRETÆ. *Lond. Dub.*
Mixture of Chalk.

Take of
- Prepared chalk, half an ounce;
- Refined sugar, three drachms;
- Gum arabic, powdered, one ounce (half an ounce, *Lond.*);
- Water, one pint.

Mix them by trituration.

THIS is a very good form of exhibiting chalk, and is an useful remedy in diseases arising from, or accompanied with, acidity in the primæ viæ. It is frequently employed in diarrhœa proceeding from that cause. The mucilage not only serves to keep the chalk suspended, but also improves its virtues. Of this medicine a pound or more may be taken in the course of a day.

MISTURA CORNU USTI. *Lond.* DECOCTUM CORNU CERVINI. *Dub.*
Mixture of Burnt Horn; Decoction of Hartshorn.

Take of
- Burnt and prepared hartshorn, two ounces;

Gum arabic, in powder, one ounce (three drachms, *Dub.*);
Water, three pints.
Boil, constantly stirring, down to two pints, and strain.

PREPARED hartshorn is phosphate of lime in a minute state of mechanical division. By boiling in a mucilaginous liquid, it is diffused and imperfectly suspended, but not a particle of it is dissolved. This is therefore an injudicious preparation; for phosphate of lime would be much more easily and effectually suspended by triturating it with a larger proportion of gum arabic, and adding the water gradually. But we believe that this preparation has no other action than that of a weak mucilage.

MISTURA FERRI COMPOSITA. *Lond.*
Compound Mixture of Iron.

Take of
Myrrh in powder, one drachm;
Subcarbonate of potass, twenty-five grains;
Rose water, seven fluidounces and a half;
Sulphate of iron in powder, one scruple;
Spirit of nutmeg, half a fluidounce;
Refined sugar, a drachm.

Triturate the myrrh with the subcarbonate of potass and the sugar; and during the trituration, add first the rose water and spirit of nutmeg, and lastly the sulphate of iron. Immediately put the mixture into a proper glass bottle, and keep it well corked.

THIS is Griffith's celebrated tonic myrrh mixture. The myrrh should be well dried and powdered in cold weather. In this mixture, it is rendered more soluble, by forming a kind of soap with the alkali; a saponaceous emulsion is next formed, by the addition of the water, which is decomposed on the addition of the sulphate of iron. The alkali combines with the sulphuric acid, while the myrrh and black oxide of iron remain suspended in the mixture. It must be carefully preserved from the action of the air, which gradually converts the black oxide of iron into the red, and decomposes the whole mixture.

ENEMA CATHARTICUM. *Dub.*
Purging Clyster.

Take of
Manna, one ounce.
Dissolve in ten ounces, by measure, of
Compound decoction of chamomile; then add of

Olive oil, one ounce;
Sulphate of magnesia, half an ounce.
Mix them.

ENEMA FŒTIDUM. *Dub.*
Fetid Clyster,

Is made by adding to the former two drachms of the tincture of assafœtida.

THESE are very useful extemporaneous preparations, and answer perfectly the purposes for which they are intended.

ACETICA.

CHAP. XXX.—MEDICATED VINEGARS.

INFUSIONS of vegetable substances in dilute acetic acid are commonly called Medicated Vinegars. The action of the acid in this case may be considered as twofold.

1. It acts simply as water, in consequence of the great quantity of water which enters into its composition, and generally extracts every thing which water is capable of extracting.

2. It exerts its own peculiar action as an acid. In consequence of this it sometimes increases the solvent power of its watery portion, or dissolves substances which water alone is incapable of dissolving: In a few instances only it impedes the solution of substances which water alone would dissolve.

As vinegar, in itself sufficiently perishable, has its tendency to decomposition commonly increased, by the solution of any vegetable matter in it, it should never be used as a menstruum, unless where it promotes the solution of the solvend, as in extracting the acrid principle of squills, colchicum, &c., and in dissolving the volatile, and especially the empyreumatic oils, or where it coincides with the virtues of the solvend; but the dilute pyrolignic acid, which is now universally used, is not liable to the same objection.

ACIDUM ACETICUM AROMATICUM. *Ed.*
Aromatic Acetic Acid.

Take of
- Rosemary tops, dried,
- Sage leaves, dried, each one ounce;
- Lavender flowers, dried, half an ounce;
- Cloves, bruised, half a drachm;
- Weak acetic acid, two pounds.

Macerate for seven days, express the liquor, and filter it through paper.

THIS is given as an improved preparation of the *Vinaigre des quatre voleurs*, which was supposed to be a certain prophylactic against the contagion of plague and similar diseases. It is in fact a pleasant solution of essential oils in vinegar, which will have more effect in correcting bad smells, than in preventing fever.

ACIDUM ACETICUM SCILLITICUM. *Ed.*
Vinegar of Squills.

Take of
- Dried squills, one ounce;
- Weak acetic acid, fifteen ounces;
- Stronger alcohol, an ounce and a half.

Macerate the squills in the acetic acid for seven days; then press out the liquor, to which add the alcohol; and when the fæces have subsided, pour off the clear liquor.

ACETUM SCILLÆ. *Lond.*
Vinegar of Squills.

Take of
- Squills, recently dried, one pound;
- Dilute acetic acid, six pints;
- Proof-spirit, half a pint.

Macerate the squills with the vinegar in a covered glass vessel, with a gentle heat, for twenty-four hours; then express the liquor, and set it aside until the fæces subside. Lastly, to the decanted liquor, add the spirit.

Dub.

Take of
- Squills, recently dried, half a pound;
- Vinegar, three pints;
- Proof-spirit, four ounces.

Macerate the squills in the vinegar for four days, in a glass vessel, frequently agitating it; then express the acid; to which, poured from the fæces after they have subsided, add the spirit.

Vinegar of squills is a medicine of great antiquity. It is a very powerful stimulant; and hence it is frequently used, with great success, as a diuretic and expectorant. The dose of this medicine is from half a drachm to a drachm or two; where crudities abound in the first passages, it may be given at first in a larger dose, to evacuate them by vomiting. It is most conveniently exhibited along with cinnamon, or other aromatic water, which prevents the nausea it would otherwise, even in small doses, be apt to occasion.

ACETUM COLCHICI. *Lond.*
Vinegar of Meadow Saffron.

Take of
Fresh root of meadow saffron, sliced, one ounce;
Dilute acetic acid, one pint;
Proof-spirit, one fluidounce.
Macerate the root with the acid, in a corked glass bottle, for three days; then express the liquor, and set it at rest that the fæces may subside; lastly, add the spirit to the defæcated liquor.

This was formerly considered to be powerfully diuretic. It is now given as an anodyne in gout and neuralgia, as the other preparations of colchicum.

ACIDUM ACETICUM CAMPHORATUM. *Dub.*
Camphorated Acetic Acid.

Take of
Acetic acid, six ounces by measure;
Camphor, half an ounce;
Rectified spirit, a sufficient quantity.
Reduce the camphor to powder, by means of the spirit; then add the acid and dissolve.

ACIDUM ACETICUM CAMPHORATUM. *Ed.*
Camphorated Acetic Acid.

Take of
Strong acetic acid, six ounces;
Camphor, half an ounce.
Triturate the camphor with a little alcohol; add it to the acid and dissolve.

The alcohol in this preparation is used merely to facilitate the reduction of the camphor to powder, and a few drops will suffice; strong acetic acid is capable of dissolving even a larger proportion of camphor than is directed in the above formula.

This solution is a powerful analeptic remedy. Its vapour, snuffed up the nostrils, which is the only method of using it, is one of the most pungent stimuli we possess. It is so extremely volatile and corrosive, that it is difficult to preserve, except in glass phials, with ground glass stoppers, or in small gold boxes, such as are used for Henry's aromatic spirit of vinegar, for which it is in fact an officinal substitute.

CHAP. XXXI.—TINCTURES.

Lond. Ed. Dub.

Tinctures ought to be made in shut glass vessels, and often shaked during the preparation.

THE term Tincture has often been employed in a very vague sense. It is now commonly applied to solutions, made by infusion or digestion, in alcohol, or diluted alcohol. But it is also extended to solutions in ether, ethereal spirits, and spirit of ammonia.

Even when a distilled spirit is the menstruum, it appears to me, that the preparation is to be considered as a tincture, unless it be again separated from the insoluble parts of the solvend by distillation, and therefore the *spiritus lavandulæ compositus* is strictly a tincture; whereas, whenever distillation is employed to effect the union, it is no longer a tincture, but a distilled spirit, and therefore the *tinctura assafœtidæ ammoniata* is properly a distilled spirit.

Alcohol is capable of dissolving resins, gum-resins, extractive, tannin, sugar, volatile oils, soaps, camphor, adipocere, colouring matters, acids, alkalies, both simple and organic, and some compound salts. Many of these, as the gum-resins, soaps, extractive, tannin, sugar, and saline substances, are also soluble in water, while water is capable of dissolving substances, such as gum, gelatin, and most of the compound salts, which are insoluble in alcohol. The insolubility of these substances, however, in the different menstrua, is not absolute, but merely relative; for a certain proportion of alcohol may be added to a solution of gum in water without decomposing it; and a solution of resin in alcohol will bear a certain admixture of water without becoming turbid. Therefore diluted alcohol, which is a mixture of these two menstrua, sometimes extracts the virtues of heterogeneous compounds more completely than either of them separately, and is commonly employed unless when the solution requires rectified spirit to render it perfect.

Alcohol is used as a menstruum,

1. When the solvend is not soluble, or is only sparingly soluble in water.
2. When a watery solution of the solvend is extremely perishable.
3. When the use of alcohol is indicated as well as that of the solvend.

In making alcoholic tinctures, we must observe that the virtues of recent vegetable matters are less perfectly extracted by spiritous menstrua than when previously carefully dried. As we cannot assist the solution by means of much heat, we must facilitate it by the mechanical division of the solvend. A coarse powder often answers best, as, when too minute, it is apt to settle and agglutinate. To prevent loss, the solution is commonly made in a close vessel, but the heat applied must be very gentle, lest it be broken by the expansion of vapour. The Edinburgh and Dublin Colleges order digestion between 90° and 100; the London employ maceration from 60° to 90°. The length of time during which the maceration is to be continued is generally seven days by the Edinburgh and Dublin Colleges, and fourteen by the London.

The action of tinctures on the living system is always compounded of the action of the menstruum, and of the matters dissolved in it. Now, these actions may either coincide with, or oppose each other; and as alcohol is at all times a powerful agent, it is evident that no substance should be exhibited in the form of a tincture, whose action is different from that of alcohol, unless it be capable of operating in so small a dose that the quantity of alcohol taken along with it is inconsiderable.

Tinctures are not liable to spoil, but they must nevertheless be kept in well-closed phials, especially when they contain active ingredients, to prevent the evaporation of the menstruum.

They generally operate in doses so small, that they are rarely exhibited by themselves, but commonly combined with some vehicle which ought not to decompose the tincture, or at least not separate any thing from it in a palpable form.

TINCTURA ACACIÆ CATECHU. *Ed.*
Tincture of Catechu.

Take of
Extract of catechu, three ounces;
Cinnamon bruised, two ounces;
Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA CATECHU. *Lond. Dub.*
Tincture of Catechu.

Take of
Extract of catechu, three ounces;
Cinnamon, bruised, two ounces;
Proof-spirit, two pints.
Digest for seven days; (macerate for fourteen, *Lond.)*, and filter.

THE cinnamon covers the taste of the catechu, and coincides with its effect.

This tincture is of service in all kinds of defluxions, catarrhs, looseness, uterine fluxes, and other disorders, where astringent medicines are indicated. Two or three tea-spoonfuls may be taken every now and then in red wine, or any other vehicle.

TINCTURA ALOES SOCOTORINÆ. *Ed.*
Tincture of Socotorine Aloes.

Take of
Socotorine aloes, in powder, half an ounce;
Extract of liquorice, an ounce and a half;
Stronger alcohol, four ounces;
Water, one pound.
Digest for seven days, and pour off the depurated tincture.

TINCTURA ALOES. *Dub.*
Tincture of Aloes.

Take of
Socotorine aloes, powdered, half an ounce;
Extract of liquorice, dissolved in eight ounces of boiling water, an ounce and a half;
Proof-spirit, eight ounces by measure.
Digest for seven days, then strain.

Lond.

Take of
Extract of spiked aloes, in powder, half an ounce;
Extract of liquorice, one ounce and a half;
Water, a pint;
Rectified spirit, four fluidounces.
Macerate for fourteen days, then strain.

This is one of the simplest of the aloëtic tinctures, and is one of the best formulæ for the exhibition of that useful drug in a fluid form. The London and Edinburgh Colleges employ an alcohol weaker than proof spirit, to render it less stimulant. The liquorice is added to cover the taste of the aloes, and to assist in suspending it in the fluid. About an ounce may be taken for a dose.

TINCTURA ALOES ET MYRRHÆ. *Ed.*
Tincture of Aloes and Myrrh.

Take of
Myrrh, in powder, two ounces;
Stronger alcohol, one pound and a half;
Water, half a pound.
Mix the alcohol with the water, then add the myrrh; digest for four days; and, lastly, add
Socotorine aloes, in powder, one ounce and a half;
Saffron, cut in pieces, one ounce.
Digest again for three days, and pour off the tincture from the sediment.

TINCTURA ALOES COMPOSITA. *Lond. Dub.*
Compound Tincture of Aloes.

Take of
Socotorine aloes, in powder,
Saffron, of each three ounces;
Tincture of myrrh, two pints.
Digest for seven days (macerate for a fortnight, *Lond.*), and strain.

This is supposed to be an improvement on the *Elixir proprietatis* of Paracelsus. The two formulæ differ considerably in strength; the latter contains one part of aloes to eight of the menstruum, which is stronger than proof spirit; the former one to sixteen, while the preceding simple tincture in weak spirit contains but one to thirty-two. In prescription these proportions must be attended to. The myrrh and saffron may add to its stimulating properties.

TINCTURA AMOMI REPENTIS. *Ed.*
Tincture of Cardamom.

Take of
Lesser cardamom seeds, bruised, four ounces;
Weaker alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

TINCTURA CARDAMOMI. *Lond. Dub.*
Tincture of Cardamom.

Take of
Lesser cardamom seeds, (husked and bruised, *Dub.)*, (bruised, *Lond.)*, three ounces;
Proof-spirit, two pints.
Digest for seven days (macerate for fourteen days, *Lond.)*, and strain.

TINCTURE of Cardamoms has been in use for a considerable time. It is a pleasant warm cordial; and may be taken, along with any proper vehicle, in doses of from a drachm to a spoonful or two.

TINCTURA CARDAMOMI COMPOSITA. *Dub.*
Compound Tincture of Cardamom.

Take of
Lesser cardamom seeds, husked and bruised,
Cochineal, in powder,
Caraway seeds, each, powdered, two drachms;
Cinnamon, bruised, half an ounce;
Proof spirit, two pints.
Digest for fourteen days, and strain.

Lond.

Take of
Cardamom seeds,
Caraway seeds,
Cochineal, of each, powdered, two drachms;
Cinnamon-bark, bruised, half an ounce;
Raisins, stoned, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS tincture is an agreeable aromatic, somewhat less stimulant than the compound tincture of cinnamon, which, besides a large proportion of aromatics, contains also long pepper. That of the London College is sweetened; that of the Dublin not, which sometimes leads patients who pass from the one kingdom to the other to suspect that the medicine is not rightly prepared.

TINCTURA ARISTOLOCHIÆ SERPENTARIÆ. *Ed.*
Tincture of Snake-Root.

Take of
Virginian snake-root, bruised, two ounces;
Cochineal, in powder, one drachm;
Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA SERPENTARIÆ. *Lond. Dub.*
Tincture of Snake-Root.

Take of
Virginian snake-root, sliced and bruised, three ounces;
Proof-spirit, two pints.
Digest for seven days (macerate for fourteen, *Lond.*), and strain.

THIS tincture, which contains the whole virtues of the root, may be taken to the quantity of a spoonful or more every five or six hours; and to this extent it often operates as an useful diaphoretic. The Edinburgh tincture is coloured by cochineal, the other not.

TINCTURA AURANTII. *Lond. Dub.*
Tincture of Orange-peel.

Take of
Fresh orange-peel, three ounces;
Proof-spirit, two pints.
Digest for three days (macerate for fourteen days, *Lond.*), and strain.

THIS tincture is an agreeable bitter, flavoured at the same time with the essential oil of the orange-peel.

TINCTURA BENZOINI COMPOSITA. *Ed.*
Compound Tincture of Benzoin.

Take of
Benzoin, in powder, three ounces;
Balsam of Tolu, two ounces;
Socotorine aloes, in powder, half an ounce;
Stronger alcohol, two pounds.
Digest for seven days, and strain through paper.

TINCTURA BENZOES COMPOSITA. *Dub.*
TINCTURA BENZOINI COMPOSITA. *Lond.*
Compound Tincture of Benzoin.

Take of
- Benzoin, three ounces;
- Purified storax, two ounces;
- Balsam of Tolu, one ounce;
- Socotorine aloes, half an ounce;
- Rectified spirit of wine, two pints.

Digest for seven days (macerate for fourteen days, *Lond.*), and filter.

THESE preparations may be considered as simplifications of some very complicated compositions, which were celebrated under different names; such as *Baume de Commandeur*, Wade's balsam, Friars balsam, Jesuits drops, &c. These, in general, consisted of a confused farago of discordant substances.

TINCTURA BONPLANDIÆ TRIFOLIATÆ. *Ed.*
TINCTURA ANGUSTURÆ. *Dub.*
Tincture of Angustura.

Take of
- Angustura bark, in coarse powder, two ounces;
- Proof-spirit of wine, two pints.

Digest for seven days, and filter.

ANGUSTURA bark readily gives out its active principles to alcohol; hence the tincture is a convenient and useful preparation.

TINCTURA CAMPHORÆ. *Ed.*
Tincture of Camphor.

Take of
- Camphor, one ounce;
- Stronger alcohol, one pound.

Mix them together, that the camphor may be dissolved.

It may also be made with a double, or triple proportion of camphor.

SPIRITUS CAMPHORÆ. *Lond.*
Spirit of Camphor.

Take of
- Camphor, four ounces;
- Rectified spirit, two pints.

Mix so as to dissolve the camphor.

SPIRITUS CAMPHORATUS. *Dub.*
Camphorated Spirit.

Take of
Camphor, one ounce;
Rectified spirit of wine, eight ounces, by measure.
Mix so as to dissolve the camphor.

THESE solutions of camphor are only employed for external uses, against rheumatic pains, paralytic numbnesses, chronic inflammation, for discussing tumours, and preventing gangrene, or restraining their progress.

TINCTURA CANTHARIDIS VESICATORIÆ. *Ed.*
Tincture of Cantharides.

Take of
Cantharides, bruised, one drachm;
Weaker alcohol, one pound.
Digest for seven days, and strain through paper.

TINCTURA CANTHARIDES. *Dub.*
Tincture of Spanish Flies.

Take of
Bruised cantharides, two drachms;
Cochineal, powdered, half a drachm;
Proof-spirit, one pint and a half.
Digest for seven days, and strain.

Lond.

Take of
Cantharides, bruised, three drachms;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS tincture contains the active principle of the cantharides. Their strength is different, being nearly as 96, 86 and 76. That of the Dublin College is coloured with cochineal, the others not. It is applied externally as a stimulant and rubefacient, and is sometimes given internally, in doses of from ten to twenty drops, as a diuretic, or as a stimulant in gleets and gonorrhœa.

TINCTURA CROTONIS ELEUTHERIÆ. *Ed.*
TINCTURA CASCARILLÆ. *Lond. Dub.*
Tincture of Cascarilla.

Take of
The bark of cascarilla, powdered, four ounces;
Proof-spirit, two pints, (two pounds and a half, *Ed.)*

Digest for seven days, (macerate for fourteen days, *Lond.)*, and strain.

The proportion of alcohol is here so large, as indeed it is in most of the tinctures of this kind, that it is merely to be considered as a concealed dram.

TINCTURA CASTOREI. *Lond. Dub.*
Tincture of Castor.

Take of
- Castor, powdered, two ounces;
- (Proof-spirit, *Dub.)* (rectified spirit, *Lond.)*, two pints.

Digest (macerate, *Lond.)* for seven days, and strain.

Ed.

Take of
- Castor in powder, an ounce and a half;
- Stronger alcohol, one pound.

Digest for seven days, and strain through paper.

The London College now agrees with that of Edinburgh, in ordering this tincture to be made with rectified spirit, but it uses a larger proportion of castor.

The tincture of castor is recommended in most kinds of nervous complaints and hysteric disorders: in the latter, it sometimes does service, though many have complained of its proving ineffectual. The Dublin College has two tinctures of castor, which differ only in the one being made with Russian, and the other with Canadian castor. The dose is from twenty drops to forty, fifty, or more.

TINCTURA CAPSICI. *Lond. Dub.*
Tincture of Capsicum.

Take of
- Capsicum pods, one ounce;
- Proof-spirit, two pints.

Macerate for fourteen days, and filter.

This is a very powerful acrid stimulant. It has been recommended in gangrenous sore throats.

TINCTURA CINCHONÆ LANCIFOLIÆ. *Ed.*
Tincture of Cinchona.

Take of
- Cinchona bark, in powder, four ounces;
- Weaker alcohol, two pounds and a half.

Digest for seven days, and filter through paper.

TINCTURA CINCHONÆ. *Dub.*
Tincture of Cinchona.

Take of
Cinchona bark, in coarse powder, four ounces;
Diluted alcohol, two pints.
Digest for seven days, and strain through paper.

TINCTURA CINCHONÆ. *Lond.*
Tincture of Cinchona.

Take of
Lance-leaved cinchona bark, in powder, seven ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS tincture is certainly impregnated with the virtues of cinchona, but not to such a degree that it can be given in sufficient doses to produce the specific effects of cinchona, without exhibiting more alcohol than what is proper to be given as a medicine. That of the London College is the best, as containing most bark.

TINCTURA CINCHONÆ COMPOSITA. *Lond. Dub. Ed.*
Compound Tincture of Cinchona.

Take of
Peruvian bark, powdered, two ounces;
Orange-peel, dried, (one ounce and a half, *Lond.*), (half an ounce, *Dub.*);
Virginian snake-root, bruised, three drachms;
Saffron, one drachm;
Cochineal, powdered, two scruples;
Proof-spirit, (twenty fluidounces, *Lond. Dub.*), twenty ounces, *Ed.*
Digest for seven days, and filter through paper, *Ed. Dub.*
Macerate for fourteen days, and filter, *Lond.*

THIS is said to be the same with the celebrated *Huxham's Tincture of Bark.*

As a corroborant and stomachic, it is given in doses of two or three drachms; but when employed for the cure of intermittents, it must be taken to a greater extent.

TINCTURA LAURI CINNAMOMI. *Ed.*
Tincture of Cinnamon.

Take of
Cinnamon, bruised, three ounces;
Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

Tinctura cinnamomi. *Lond. Dub.*
Tincture of Cinnamon.

Take of
Cinnamon, bruised, three ounces, *Lond.* (three ounces and a half, *Dub.*);
Proof-spirit of wine, two pints.
Digest for seven days, (macerate for fourteen days, *Lond.*), and strain.

The tincture of cinnamon possesses the astringent virtues of the cinnamon, as well as its aromatic cordial ones; and in his respect it differs from the spirit prepared by distillation.

Tinctura cinnamomi composita. *Ed.*
Compound Tincture of Cinnamon.

Take of
Cinnamon bark, bruised,
Lesser cardamom seeds, bruised, each one ounce;
Long pepper, in powder, two drachms;
Weaker alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

Lond. Dub.

Take of
Cinnamon, bruised, six drachms;
Lesser cardamom seeds, husked and bruised, three drachms;
Long pepper, in powder,
Ginger, sliced, of each two drachms;
Proof-spirit, two pints.
Mix and digest for seven days (macerate for fourteen, *Lond.*), then strain.

In their formula the Dublin and London Colleges have smaller quantity of cardamom seeds, and substitute for a proportion of ginger. This makes no alteration in he virtues of the preparation, which is a very warm aromac. A tea-spoonful or two may be taken in wine, or any ther convenient vehicle, in languor, weakness of the stoach, flatulencies, and other similar complaints; and in these ses it is often employed with advantage.

Tinctura colombæ. *Ed.* Tinctura columbo. *Dub.*
Tincture of Columba.

ake of
Columba root, powdered, two ounces;
Proof-spirit of wine, two pints.
igest for seven days, and filter through paper.

TINCTURA CALUMBÆ. *Lond.*
Tincture of Colomba.

Take of
Colomba root, sliced, two ounces and a half;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THIS is a very good stomachic tincture, which may be used when the stomach will not bear the colomba in powder.

TINCTURA CONII MACULATI. *Ed.*
Tincture of Hemlock.

Take of
Hemlock leaves, dried, two ounces;
Lesser cardamom seeds, bruised, half an ounce;
Weaker alcohol, sixteen ounces.
Digest for seven days, and filter though paper.

THIS is now first introduced as another anodyne tincture. There is some advantage in having a variety of them, as the idiosyncrasies in respect to them are often very singular. We have no experience of its powers.

TINCTURA CONVOLVULI JALAPÆ. *Ed.*
Tincture of Jalap.

Take of
Jalap, in powder, three ounces;
Weaker alcohol, fifteen ounces.
Digest for seven days, and strain the tincture through paper.

TINCTURA JALAPÆ. *Lond.*
Tincture of Jalap.

Take of
Jalap, in powder, eight ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

Dub.

Take of
Jalap, in coarse powder, five ounces;
Proof-spirit, two pints.
Digest for seven days, and filter.

RECTIFIED spirit was formerly ordered for the preparation of this tincture; but proof-spirit is a preferable menstruum, as it dissolves the active constituents of the jalap, equally well, and is less stimulating. The Dublin is the weakest, and the London the strongest of the three tinctures.

TINCTURA CROCI SATIVI. *Ed.* TINCTURA CROCI. *Dub.*
Tincture of Saffron.

Take of
Saffron, cut in shreds, one ounce;
Diluted alcohol, fifteen ounces (one pint, *Dub.*)
Digest for seven days, and strain through paper.

THE proof-spirit is a very proper menstruum for extracting the medical virtues of the saffron, and affords a convenient mode of exhibiting that drug.

TINCTURA DIGITALIS PURPUREÆ. *Ed.*
Tincture of Foxglove.

Take of
The dried leaves of foxglove, one ounce;
Weaker alcohol, eight ounces.
Digest for seven days, and strain through paper.

TINCTURA DIGITALIS. *Dub.*
Tincture of Foxglove.

Take of
The leaves of foxglove, (rejecting the larger ones,) dried, and in coarse powder, two ounces;
Proof-spirit, one pint.
Digest for seven days, and filter.

Lond.

Take of
Leaves of foxglove, dried, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

THIS tincture is a very powerful medicine, and contains the virtues of the foxglove in a very manageable form. It has been chiefly used to diminish the force of the circulation of the blood in hæmoptysis, and often with remarkable success. It has been also said to cure incipient phthisis pulmonalis; but subsequent experience has not confirmed the first reports. It is also frequently given as a diuretic in dropsies. Like every other form in which foxglove is given, it should be administered in very small doses at first, such as from ten to twenty drops, and cautiously increased.

TINCTURA FERULÆ ASSÆ FŒTIDÆ. *Ed.*
Tincture of Assafœtida.

Take of
Assafœtida, four ounces;
Stronger alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA ASSAFŒTIDÆ. *Lond.*
Tincture of Assafœtida.

Take of
Assafœtida, four ounces;
Rectified spirit, two pints.
Macerate for a fortnight, and filter.

Dub.

Take of
Assafœtida, four ounces;
Rectified spirit of wine, two pints;
Water, eight ounces by measure.
Add the spirit to the assafœtida, triturated with the water, and digest for seven days; then strain.

THIS tincture possesses the virtues of the assafœtida, and may be given in doses of from ten drops to fifty or sixty.

TINCTURA GALBANI. *Dub.*
Tincture of Galbanum.

Take of
Galbanum, cut into small pieces, two ounces;
Proof-spirit of wine, two pints.
Digest with a gentle heat for seven days, and strain.

THIS tincture, though not so powerful, is less nauseous than that of assafœtida, and therefore in some cases may be preferable.

TINCTURA GALLARUM. *Dub. Ed.*
Tincture of Galls.

Take of
Galls, in powder, four ounces, (two ounces, *Ed.*)
Proof-spirit, two pints, (sixteen ounces, *Ed.*)
Mix; digest for seven days, and filter.

THIS tincture was for the first time introduced into practice by the Dublin College, and is a very powerful astringent.

TINCTURA GENTIANÆ COMPOSITA. *Ed.*
Compound Tincture of Gentian.

Take of
Gentian root, sliced and bruised, two ounces;
Seville orange peel, dried and bruised, one ounce;
Canella alba, bruised, half an ounce;
Cochineal, in powder, half a drachm;
Weaker alcohol, two pounds and a half.
Macerate for seven days, and strain through paper.

Dub.

Take of
Gentian root, sliced and bruised, two ounces;
Dried rind of Seville oranges, one ounce;
Lesser cardamom seeds, husked and bruised, half an ounce;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

Lond.

Take of
Gentian root, sliced, two ounces;
Orange-peel dried, one ounce;
Cardamom seeds bruised, half an ounce;
Proof-spirit, two pints.
Macerate for fourteen days, with a gentle heat, and strain.

THESE are very elegant spiritous bitters. The first is coloured red, the other two not.

TINCTURA GUAIACI OFFICINALIS. *Ed.*
Tincture of Guaiac.

Take of
Guaiac resin, in powder, six ounces;
Stronger alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

TINCTURA GUAIACI. *Dub.*
Tincture of Guaiac.

Take of
Guaiac, four ounces;
Rectified spirit of wine, two pints.
Digest for seven days, and filter.

Lond.

Take of
Guaiac gum resin, in powder, half a pound;

Rectified spirit, two pints.
Macerate for fourteen days, and filter.

What is called gum guaiac is in fact a resin, and perfectly soluble in alcohol. This solution is a powerful stimulating sudorific, and may be given in doses of about half an ounce, in rheumatic and arthritic cases. It was once supposed to be a specific against the gout.

TINCTURA HELLEBORI NIGRI. *Dub.*
Tincture of Black Hellebore.

Take of
Black hellebore root, in coarse powder, four ounces;
Cochineal, powdered, two scruples;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

Ed.

Take of
Black hellebore root, bruised, two ounces;
Cochineal, in powder, fifteen grains;
Weaker alcohol, fifteen ounces.
Digest for seven days, and filter through paper.

Lond.

Take of
Black hellebore root, sliced, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

This is perhaps the best preparation of hellebore, when designed for an alterative. It has been found particularly serviceable in uterine obstructions. In sanguine constitutions, where chalybeates are hurtful, it has been said that it seldom fails of exciting the menstrual evacuation, and removing the bad effects of its suppression. A tea spoonful of the tincture may be taken twice a-day in warm water, or any other convenient vehicle.

TINCTURA HUMULI LUPULI. *Ed.*
TINCTURA HUMULI. *Lond.*
Tincture of Hops.

Take of
Hops, five ounces;
Proof-spirit, two pints, (two pounds and a half, *Ed.)*
Macerate for fourteen days, (seven days, *Ed.)*, and filter.

Opium in every form disagrees so much with some people, as to render its exhibition to them improper. In these cases, we must have recourse to other narcotics, and of these the hop is one of the safest and most agreeable. Its comparative strength is not yet well ascertained, nor even the best form of exhibiting it.

In their natural form hops are so extremely light and bulky, as to absorb and retain a great deal of the spirit employed to extract a tincture from it, even when subjected to much compression. But when it is thoroughly dried, it may be rubbed between the hands to a sufficiently fine powder, from which the tincture may be prepared without much loss.

Tinctura hyosciami nigri. *Ed.*
Tincture of Henbane.

Take of
The leaves of henbane, dried, one ounce;
Weaker alcohol, eight ounces.
Digest for seven days, and strain through paper.

Tinctura hyosciami. *Dub.*
Tincture of Henbane.

Take of
Henbane leaves, dried, and in coarse powder, two ounces and a quarter;
Proof-spirit, one pint.
Macerate for fourteen days, and strain.

Lond.

Take of
Henbane leaves, dried, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

This tincture, now come into very general use, is a valuable anodyne, and in many cases may be substituted with advantage for the tincture of opium, especially where the latter produces obstinate constipation, or, instead of its usual soporific and sedative effects, causes uneasiness, restlessness, and universal irritation.

An anonymous correspondent observes, that it is useful in recent coughs, in doses to an adult of not less than thirty drops, with ten drops of laudanum, which is equal to thirty drops of the latter. Tincture of henbane alone sometimes purges; when this is an inconvenience, it is corrected by the addition of a few drops of laudanum.

TINCTURA KINO. *Ed.*
Tincture of Kino.

Take of
Kino in powder, two ounces;
Weaker alcohol, a pound and a half.
Digest for seven days, and strain through paper.

Dub.

Take of
Kino, in powder, three ounces;
Proof-spirit, a pint and a half.
Digest for seven days, and filter.

Lond.

Take of
Kino, in powder, three ounces;
Rectified spirit, two pints.
Macerate for fourteen days, and filter.

THIS is a very astringent tincture, and will be found an excellent medicine in obstinate diarrhœas, and in lienteria. Very different articles, I have already observed, are sold under the appellation of Kino, and with some of them the tincture turns out gelatinous. The London College now use rectified spirit as the menstruum.

SPIRITUS LAVANDULÆ COMPOSITUS. *Ed.*
Compound Spirit of Lavender.

Take of
Spirit of lavender, three pounds;
Spirit of rosemary, one pound;
Cinnamon bark, bruised, one ounce;
Cloves, bruised, two drachms;
Nutmeg, bruised, half an ounce;
Red saunders wood, in shavings, three drachms.
Macerate for seven days, and filter.

SPIRITUS LAVANDULÆ COMPOSITUS. *Lond. Dub.*
Compound Spirit of Lavender.

Take of
Spirit of lavender, three pints;
Spirit of rosemary, one pint;
Cinnamon bark, bruised,
Nutmegs, bruised, of each half an ounce;
(Cloves, two drachms, *Dub.*)
Red saunders wood, sliced, one ounce.

Digest for ten days, (macerate for fourteen days, *Lond.)*, and strain.

These preparations do not differ materially. They are grateful cordials, of which from ten to a hundred drops may be conveniently taken, dropt upon sugar. Although the spirit of lavender be the predominant ingredient, yet the mode of preparation is that of a tincture, and the spirit as a menstruum dissolves astringent, colouring, and other substances, which would not rise with it in distillation.

TINCTURA MOSCHI. *Dub.*
Tincture of Musk.

Take of
  Musk, in powder, two drachms;
  Rectified spirit of wine, one pint.
Digest for seven days, and strain.

Rectified spirit is the most complete menstruum for musk; but in this form it is often impossible to give a sufficient quantity of the musk.

TINCTURA MYRRHÆ. *Ed.*
Tincture of Myrrh.

Take of
  Myrrh, in powder, three ounces;
  Stronger alcohol, twenty ounces;
  Water, ten ounces.
Digest for seven days, and strain through paper.

Lond.

Take of
  Myrrh, bruised, four ounces;
  Rectified spirit, three pints;
Macerate for fourteen days, and strain.

Dub.

Take of
  Myrrh, bruised, three ounces;
  Proof-spirit of wine, a pint and a half;
  Rectified spirit of wine, half a pint.
Digest for seven days and filter.

It is esteemed a great perfection in tincture of myrrh to be perfectly transparent, which can only be attained by using strong spirit and select myrrh.

Tincture of myrrh is recommended internally as a cardiac, for removing obstructions, particularly those of the uterine vessels, and for resisting putrefaction. The dose is from fifteen drops to forty or more. The medicine may perhaps be given in these cases to advantage; though, with us, it is more commonly used externally, for cleansing foul ulcers, and promoting the exfoliation of carious bones.

TINCTURA OPII, sive THEBAICA; vulgo LAUDANUM LIQUIDUM. *Ed.*

Tincture of Opium, or *Thebaic Tincture*, commonly called *Liquid Laudanum.*

Take of
  Opium, two ounces;
  Weaker alcohol, two pounds.
Digest for seven days, and filter through paper.

Dub.

Take of
  Hard purified opium, powdered, ten drachms;
  Proof-spirit of wine, one pint.
Digest for seven days, and strain.

Lond.

Take of
  Hard opium, powdered, two ounces and a half;
  Proof-spirit, two pints.
Macerate for fourteen days, and strain.

As these tinctures, on evaporation, furnish the same quanty of extract, they are believed to be of nearly equal strength; but it is to be regretted that they are not so well adapted for keeping as could be wished: after some time a part of the opium is gradually deposited from both, and consequently the tinctures become weaker: the part which thus separates amounts sometimes, it is said, to near one-fourth of the quantity of opium at first dissolved. Mr Phillips found, that when alcohol of sp. gr. 0.930 was employed with select crude opium, the tincture acquired sp. gr. 0.952, and contained 26 grains of opium *per* fluidounce; but when purified opium was used, the sp. gr. of the tincture was 0.958, and the quantity of opium in the fluidounce 36 grains; of the crude opium one grain in 3.5 remained undissolved, and of the purified only one in twenty-five; while in the tincture made with the former, one grain of opium was contained in 18.3 minims, and in that with the latter in 13.3, so that from calculation the strength of the tincture made with purified opium is to that made with crude opium as three to two nearly. But I must here observe, that calculation cannot be altogether relied upon in this case, because although purified opium contains more soluble matter than crude opium, its narcotic powers may be diminished by the preparation it has undergone.

TINCTURA OPII CAMPHORATA, vulgo ELIXIR PAREGORICUM ANGLORUM. *Ed.*

Camphorated Tincture of Opium, or English Paregoric Elixir.

Take of
Camphor, two scruples;
Benzoic acid,
Opium, of each a drachm;
Weaker alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

TINCTURA OPII CAMPHORATA, sive ELIXIR PAREGORICUM. *Dub.*

Camphorated Tincture of Opium. Paregoric Elixir.

Take of
Camphor, two scruples;
Hard purified opium, in powder,
Benzoic acid, of each one drachm;
Essential oil of aniseed, one drachm;
Proof-spirit of wine, two pints.
Digest for seven days, and strain.

TINCTURA CAMPHORÆ COMPOSITA. *Lond.*

Compound Tincture of Camphor.

Take of
Camphor, two scruples;
Hard opium, in powder,
Benzoic acid, of each one drachm;
Proof-spirit, two pints.
Macerate for fourteen days, and filter.

IN this formula, the virtues of the opium and camphor are combined. The benzoic acid and oil of aniseed were supposed to be balsamic. The oil gives a peculiarity to that of the Dublin College, which is offensive to many. It was originally prescribed under the title of *Elixir Asthmaticum*, which it does not ill deserve. It contributes to allay the tickling which provokes frequent coughing; and at the same time it is supposed to open the breast, and give greater liberty of breathing. It is given to children against the chincough, &c. in doses of from five drops to twenty: to adults, from twenty to an hundred. Half an ounce, by measure, contains about a grain of opium.

TINCTURA QUASSIÆ EXCELSÆ. *Ed.* TINCTURA QUASSIÆ. *Dub.*
Tincture of Quassia.

Take of
  Shavings of quassia, one ounce;
  Proof-spirit, two pints, (two pounds and a half, *Ed.*)
Digest for seven days, and filter.

As the Dublin College first introduced into their Pharmacopœia the most powerful of all astringent tinctures, in the present instance they also first directed a tincture to be prepared from the purest and most intense of all bitters, and in both instances they have been followed by Edinburgh.

TINCTURA RHEI. *Ed.*
Tincture of Rhubarb.

Take of
  Russian rhubarb, sliced, three ounces;
  Lesser cardamom seeds, bruised, half an ounce;
  Weaker alcohol, two pounds and a half.
Digest for seven days, and strain through paper.

Lond.

Take of
  Rhubarb, sliced, two ounces;
  Lesser cardamom seeds, bruised, half an ounce;
  Saffron, two drachms;
  Proof-spirit, two pints.
Macerate for fourteen days, and filter.

Dub.

Take of
  Rhubarb, cut into pieces, two ounces;
  Lesser cardamom seeds, husked and bruised,
  Liquorice root, bruised, of each, half an ounce;
  Saffron, two drachms;
  Proof-spirit of wine, two pints.
Digest for seven days, and strain.

THE two first are simple tinctures of rhubarb, with the addition of cardamoms only as a corrigent. The last is also sweetened with liquorice, and corresponds with the following compound tincture of the London College.

TINCTURA RHEI COMPOSITA. *Lond.*
Compound Tincture of Rhubarb.

Take of
Rhubarb, sliced, two ounces;
Liquorice root, bruised, half an ounce;
Ginger, sliced,
Saffron, each two drachms;
Proof-spirit, one pint;
Water, twelve fluidounces.
acerate for fourteen days, and strain.

TINCTURA RHEI ET ALOES. *Ed.*
Tincture of Rhubarb and Aloes.

ake of
Russian rhubarb, sliced, ten drachms;
Socotorine aloes, in powder, six drachms;
Lesser cardamom seeds, bruised, half an ounce;
Weaker alcohol, two pounds and a half.
igest for seven days, and strain though paper.

TINCTURA RHEI ET GENTIANÆ. *Ed.*
Tincture of Rhubarb with Gentian.

ake of
Russian rhubarb, sliced, two ounces;
Gentian root, sliced, half an ounce;
Weaker alcohol, two pounds and a half.
igest for seven days, and strain though paper.

ALL the foregoing tinctures of rhubarb are designed as sto-achics and corroborants, as well as purgatives; spiritous quors extract freely those principles of the rhubarb in hich the two first qualities reside, and the aromatics and ntians considerably promote their efficacy. In weakness the stomach, indigestion, laxity of the intestines, diar-œas, colic, and other similar complaints, these medicines e frequently of great service. The tincture with the ad-tion of aloes is more efficacious as a purgative.

INCTURA SAPONIS CAMPHORATA, vulgo LINIMENTUM SAPONACEUM. *Ed.*
amphorated Tincture of Soap, formerly *Saponaceous Liniment.*

ake of
Hard soap, in shavings, four ounces;
Camphor, two ounces;
Volatile oil of rosemary, half an ounce;
Stronger alcohol, two pounds.

Digest the soap in the alcohol for three days; then add to the filtered liquor the camphor and the oil, shaking them well together.

LINIMENTUM SAPONIS COMPOSITUM. *Lond.*
Compound Soap Liniment.

Take of
- Hard soap, three ounces;
- Camphor, one ounce;
- Spirit of rosemary, one pint.

Dissolve the camphor in the spirit; then add the soap, and macerate in a sand-bath until it be dissolved.

LINIMENTUM SAPONIS. *Dub.*
Soap Liniment.

Take of
- Soap, three ounces;
- Camphor, one ounce;
- Spirit of rosemary, one pint.

Digest the soap in the spirit of rosemary until it be dissolved, then add the camphor.

TINCTURA SAPONIS ET OPII; vulgo LINIMENTUM ANODYNUM. *Ed.*
Tincture of Soap with Opium, commonly called *Anodyne Liniment.*

Take of
- Hard soap, shaved, four ounces;
- Opium, one ounce;
- Camphor, two ounces;
- Volatile oil of rosemary, half an ounce;
- Stronger alcohol, two pounds.

Digest the soap and opium in the alcohol for three days; then add to the filtered liquor the camphor and oil, and shake them well.

THESE tinctures are only used externally, and possess great efficacy in removing local pains, when rubbed on the affected part. The London and Dublin Colleges have omitted the anodyne liniment, probably as it may be easily prepared extemporaneously, by mixing an equivalent proportion of laudanum with soap liniment.

TINCTURA SCILLÆ MARITIMÆ. *Ed.*
Tincture of Squills.

Take of
Fresh dried squills, two ounces;
Weaker alcohol, sixteen ounces.
Digest for seven days, and filter through paper.

TINCTURA SCILLÆ. *Dub.*
Tincture of Squills.

Take of
Squills, fresh dried, four ounces;
Proof-spirit of wine, two pints.
Digest for seven days; then set it aside, and when the fæces have subsided, pour off the pure liquor.

Lond.

Take of
Squills, fresh dried, four ounces;
Proof-spirit, two pints.
Macerate for fourteen days, and strain.

THE active principle of squills is soluble in alcohol, and the tincture is a useful remedy in doses of ten drops or more three times a-day.

TINCTURA SENNÆ COMPOSITA. *Ed.*
Compound Tincture of Senna.

Take of
Senna leaves, two ounces;
Jalap root, bruised, one ounce;
Coriander seeds, bruised, half an ounce;
Weaker alcohol, three pounds and a-half.
Digest for seven days, and to the tincture, filtered through paper, add,
Double refined sugar, four ounces.

TINCTURA SENNÆ. *Dub.*
Tincture of Senna.

Take of
Senna leaves, one pound;
Caraway seeds, bruised, one ounce and a half;
Lesser cardamom seeds, husked and bruised, half an ounce;
Proof-spirit, one gallon.
Digest for fourteen days, and strain.

Lond.

Take of
- Senna leaves, three ounces ;
- Caraway seeds, bruised, three drachms ;
- Cardamom seeds, bruised, one drachm ;
- Raisins, stoned, four ounces ;
- Proof-spirit, two pints.

Macerate for fourteen days, with a gentle heat, and filter.

These tinctures are useful carminatives and cathartics, especially to those who have accustomed themselves to the use of spiritous liquors ; they often relieve flatulent complaints and colics, where the common cordials have little effect ; the dose is from one to two ounces.

TINCTURA TOLUIFERI BALSAMI. *Ed.*
Tincture of the Balsam of Tolu.

Take of
- Balsam of Tolu, an ounce and a half ;
- Stronger alcohol, one pound.

Digest until the balsam be dissolved ; and strain the tincture through paper.

TINCTURA BALSAMI TOLUTANI. *Dub.*
Tincture of Balsam of Tolu.

Take of
- Balsam of Tolu, one ounce ;
- Rectified spirit, one pint.

Digest until the balsam be dissolved, and filter.

This solution of balsam of Tolu possesses all the virtues of the balsam itself. It may be taken internally, with the several intentions for which that balsam is proper, to the quantity of a tea-spoonful or two, in any convenient vehicle. Mixed with simple syrup, it forms an elegant balsamic syrup.

TINCTURA VALERIANÆ. *Lond. Dub.*
Tincture of Valerian.

Take of
- The root of wild valerian, in coarse powder, four ounces ;
- Proof-spirit, two pints.

Digest for seven days, (macerate for fourteen, *Lond.*) and strain.

This tincture has a deep colour, and is strongly impregnated with the valerian ; though it has not been found to answer so well in the cure of hysteric disorders as the root in ubstance, exhibited in the form of powder or bolus. The lose of the tincture is from half a spoonful to a spoonful or nore, two or three times a-day.

TINCTURA VERATRI ALBI. *Ed.*
Tincture of White Hellebore.

ake of
White hellebore root, bruised, four ounces;
Diluted alcohol, sixteen ounces.
igest for seven days, and filter the tincture through paper.

THIS tincture cannot fail to be a powerful and even a angerous remedy, since it contains the very active alkali *eratria.* It is sometimes used for assisting cathartics, &c. nd as an emetic in apoplectic and maniacal disorders. It nay likewise be so managed, as to prove a powerful alteraive and deobstruent in cases where milder remedies have ttle effect. But a great deal of caution is requisite in its se; the dose at first ought to be only a few drops; if conderable, it proves violently emetic or cathartic.

TINCTURA ZINGIBERIS. *Lond. Dub.*
Tincture of Ginger.

ake of
Ginger sliced, (in coarse powder, *Dub.*), two ounces;
Rectified spirit, two pints.
igest in a gentle heat for seven days, (macerate fourteen, *Lond.*) and strain.

TINCTURA AMOMI ZINGIBERIS. *Ed.*
Tincture of Ginger.

ake of
Ginger, bruised, two ounces;
Weaker alcohol, two pounds and a half.
igest for seven days, and filter through paper.

THE tincture prepared with proof spirit is always muddy, ut a clear tincture is got by using two pounds of rectied spirit, and half a pound of spirit 7° above proof. The ondon College now order rectified spirit.

CHAP. XXXII.

TINCTURES MADE WITH ETHERIAL SPIRITS.

WE have classed these tinctures by themselves, because they are more strongly characterised by the nature of the menstruum than of the substances dissolved in it. Indeed, the etherial spirits are used in these instances, not to dissolve substances which would resist the action of alcohol and water, but for the sake of their own direct action on the system.

TINCTURA ALOES ÆTHEREA. *Ed.*
Etherial Tincture of Aloes.

Take of
Socotorine aloes,
Myrrh, of each, in powder, one ounce and a half;
Saffron, sliced, one ounce;
Sulphuric ether with alcohol, one pound.
Digest the myrrh with the ether for four days; then add the saffron and aloes.
Digest again for four days, and when the fæces have subsided, pour off the tincture.

THIS tincture agrees generally in its effects with the other tinctures of aloes, the only difference arising from the more penetrating and stimulating nature of the menstruum itself.

ÆTHER SULPHURICUS CUM ALCOHOLE AROMATICUS. *Ed.*
Aromatic Sulphuric Ether with Alcohol.

Take of
Cinnamon bark, bruised,
Lesser cardamom seeds, bruised, of each an ounce;
Long pepper, in powder, two drachms;
Sulphuric ether with alcohol, two pounds and a half.
Digest for seven days, and filter through paper.

THIS is designed for persons whose stomachs are too weak to bear the following acid tincture: to the taste it is gratefully aromatic, without any perceptible acidity.

ACIDUM SULPHURICUM AROMATICUM. *Ed.*
Aromatic Sulphuric Acid.

Take of
  Alcohol, two pounds;
  Sulphuric acid, six ounces.

Drop the acid gradually into the alcohol. Digest the mixture with a very gentle heat, in a close vessel, for three days, and then add, of
  Cinnamon bark, bruised, one ounce and a half;
  Ginger root, bruised, one ounce.

Digest again, in a close vessel, for six days, and then filter the tincture through paper placed in a glass funnel.

ALTHOUGH the name given to this preparation by the colleges does not sanction its arrangement with the etherial tinctures, yet I have ventured to place it here, from the belief that the alcohol is completely or partially changed, by the digestion with the acid into an etherial spirit; and that the principal difference between this and the preceding tincture consists in the presence of the acid, which, however, is not to be considered as the menstruum by which the tincture is formed, but as an acid mixed with the etherial tincture.

Medical use.—This is a valuable medicine in weakness and relaxation of the stomach, and decay of constitution, particularly in those cases which proceed from irregularities, which are accompanied with slow febrile symptoms, or which follow the suppression of intermittents. It frequently succeeds, after bitters and aromatics by themselves have availed nothing; and indeed great part of its virtues depend on the sulphuric acid, which, simply diluted with water, has nearly equal powers.

It is very usefully conjoined with cinchona, and other tonic barks, not only as covering their disagreeable taste, but also as coinciding with them in virtue, and very probably, by rendering the alkaloids, as cinchona and quinia, more soluble in water. It may be given in doses of from ten to thirty drops, or more, several times a-day.

CHAP. XXXIII.

AMMONIATED OR VOLATILE TINCTURES.

AMMONIA, like ether, is so powerful an agent on the living system, that it gives a peculiar character to the compositions into which it enters. They are all highly stimulating and pungent, and apt to excite diaphoresis. As ammonia, exerts considerable and peculiar powers as a solvent, these tinctures must never be combined in prescription with any thing acid, which would not only neutralize the ammonia, and destroy its peculiar action on the living system, but would precipitate whatever was dissolved by its agency.

LINIMENTUM CAMPHORÆ COMPOSITUM. *Lond.*
Compound Camphor Liniment.

Take of
Camphor, two ounces;
Water of ammonia, six fluidounces;
Spirit of lavender, a pint.

Mix the water of ammonia with the spirit; and distil from a glass retort, with a slow fire, one pint. Then dissolve the camphor in the distilled liquor.

THIS is more pungent and penetrating than the solution of camphor in alcohol. By the distillation the water with which the ammonia was combined is left as a residuum, and a strong ammoniated alcohol is obtained; but the same end could be obtained by using the strong water of ammonia of the Edinburgh College, without the trouble of distillation. There is no danger of its being too caustic.

TINCTURA CASTOREI COMPOSITA. *Ed.*
Compound Tincture of Castor.

Take of
Castor, in powder, one ounce;
Assafœtida, half an ounce;
Ammoniated alcohol, one pound.

Digest for seven days, and filter through paper.

This composition is a medicine of real efficacy, particularly in hysterical disorders, and the several symptoms which accompany them. The ammoniated alcohol is an excellent menstruum for the castor and the assafœtida, and greatly adds to their virtues.

TINCTURA CINCHONÆ AMMONIATA. *Lond.*
Ammoniated Tincture of Cinchona.

Take of
Lance-leaved cinchona bark, in powder, four ounces;
Aromatic spirit of ammonia, two pints.
Macerate for ten days, and strain.

This is now first introduced by the London College. It does not appear to be a very judicious preparation, or at least it can only act as a modification of ammoniated alcohol, for the cinchona cannot be supposed to contribute at all to its effects.

SPIRITUS COLCHICI AMMONIATUS. *Lond.*
Ammoniated Spirit of Colchicum.

Take of
Colchicum seeds, bruised, two ounces;
Aromatic spirit of ammonia, one pint.
Macerate for fourteen days, and filter.

This is a new preparation of colchicum. The seeds of this plant contain its narcotic principle; and as they are less liable to variation and much less to decay than the root, they are perhaps preferable as the material for all its preparations. The selection of this menstruum is probably intended to combine, with the narcotic, a diffusible stimulus as a corrector.

TINCTURA GUAIACI AMMONIATA. *Ed. Dub.*
Ammoniated Tincture of Guaiac.

Take of
Resin of guaiac, in powder, four ounces;
Ammoniated alcohol, one pound and a half (one pint and a half, *Dub.)*
Digest for seven days, and filter through paper.

Lond.

Take of
Guaiac gum resin, in powder, four ounces;
Aromatic spirit of ammonia, one pint and a half.
Macerate for fourteen days, and filter.

These are very elegant and efficacious tinctures; the ammoniated spirit readily dissolving the resin, and, at the same time, promoting its medicinal virtue. In rheumatic cases, a tea, or even table spoonful, taken every morning and evening, in any convenient vehicle, particularly in milk, has proved of singular service.

TINCTURA OPII AMMONIATA; olim ELIXIR PAREGORICUM. *Ed.*
Ammoniated Tincture of Opium, formerly *Paregoric Elixir.*

Take of
- Opium, two drachms;
- Saffron, sliced,
- Benzoic acid, of each three drachms;
- Volatile oil of aniseed, half a drachm;
- Ammoniated alcohol, sixteen ounces.

Digest for seven days, and filter through paper.

This is a preparation of considerable efficacy in many spasmodic diseases, as chincough, &c., the ammonia removing the spasm immediately, while the opium tends to prevent its return. Each drachm contains about a grain of opium.

TINCTURA VALERIANÆ AMMONIATA. *Lond.*
Ammoniated Tincture of Valerian.

Take of
- Valerian root, four ounces;
- Aromatic spirit of ammonia, two pints.

Macerate for fourteen days, and strain.

Dub. Ed.

Take of
- Valerian root, in powder, two ounces, (four ounces, *Ed.)*
- Spirit of ammonia, one pint, (two pounds and a half, *Ed.)*

Digest for seven days, and filter.

The spirit of ammonia, both simple and compound, is here an excellent menstruum, and, at the same time, considerably promotes the virtues of the valerian, which, in some cases, wants assistance of this kind. The dose may be a tea-spoonful or two.

SPIRITUS AMMONIÆ SUCCINATUS. *Lond.*
Succinated Spirit of Ammonia.

Take of
- Mastiche, three drachms;

Rectified spirit, nine fluidrachms;
Oil of lavender, fourteen minims;
Oil of amber, four minims;
Solution of ammonia, ten fluidounces.

Macerate the mastiche in the alcohol until it be dissolved. Pour off the clear tincture; then add the other ingredients, and mix them by shaking.

This preparation is intended as a substitute for *Eau de Luce;* but without some peculiar manipulation, which is kept secret, the above formula does not succeed in giving the liquor that permanent milky opacity, which is deemed essential to good *Eau de Luce;* for it becomes more or less transparent by keeping. This fancied perfection is, however, in a medical point of view, immaterial; and, whether it be milky or transparent, it is an excellent analeptic remedy, and may be used in the same circumstances, and in the same doses, as the spirit of ammonia itself.

Chap. XXXIV.—MEDICATED WINES.

Wines are to be prepared in corked phials, and frequently shaked during their preparation. *Ed.*

Parmentier has laboured to prove that wine is an extremely bad menstruum for extracting the virtues of medical substances. His only argument is, that, by the infusion of vegetable substances in wine, its natural tendency to decomposition is so much accelerated, that at the end of the process, instead of wine, we have only a liquor containing the elements of bad vinegar. As a solvent, diluted alcohol perfectly supersedes the use of wine; and if we wish to use wine to cover the taste, or to assist the operation of any medicine, M. Parmentier proposes that a tincture of the substance should be extemporaneously mixed with wine as a vehicle.

The London College have adopted these ideas so entirely in their last edition (1825,) that they have rejected altogether the use of wine in pharmacy, and even erased it from the Materia Medica. They have however retained the titles of the old wines, substituting a mixture of spirits and water. The proportion of these, taken as equivalent to wine, is not however uniform. In the *Vinum aloes* and *V. colchici*, it is one part of proof spirit to two of water; in the *V. ipecacuanhæ*, and *V. opii*, three to five, and in the *V. veratri*, two to three.

VINUM ALOES SOCOTORINÆ. *Ed.*
Wine of Socotorine Aloes.

Take of
- Socotorine aloes, in powder, one ounce;
- Lesser cardamom seeds, bruised,
- Ginger, bruised, each one drachm;
- Sherry, two pounds.

Digest for seven days, and strain.

VINUM ALOES. *Dub.*
Wine of Aloes.

Take of
- Socotorine aloes, four ounces;
- Canella alba, one ounce;
- Spanish white wine, three pints;
- Proof-spirit, one pint.

Powder the aloes and canella alba separately; then mix and pour on the wine, mixed with the spirit; afterwards digest for fourteen days, frequently shaking the vessel; and, lastly, filter the liquor.

Lond.

Take of
- Socotorine aloes, eight ounces;
- Canella alba, two ounces;
- Proof-spirit,
- Distilled water, of each, four pints.

Triturate the aloes with well washed white sand to powder; also powder the canella, and pour the spirit and water upon these powders mixed together. Macerate for fourteen days, now and then shaking them, and strain.

THE sand is added to facilitate the pulverization of the aloes, and to prevent it, when moistened by the fluids, from running together into masses. It is evident that it does not affect the tincture.

Aloetic wine has long been in great esteem, not only as a cathartic, but likewise as a stimulus.

It appears from long experience to be a very useful medicine. The dose, as a purgative, is from one to two ounces. It may be introduced into the habit, so as to be productive of excellent effects, as an alterant, by giving it in small doses, at proper intervals. Thus managed, it does not for a considerable time operate remarkably by stool; but at length proves purgative, and occasions a lax habit, of much longer continuance than that produced by the other common cathartics.

VINUM GENTIANÆ COMPOSITUM. *Ed.*
Compound Wine of Gentian.

Take of
- Gentian root, half an ounce;
- Cinchona bark, one ounce;
- Seville orange-peel, dried, two drachms;
- Canella alba, one drachm;
- Weaker alcohol, four ounces;
- Sherry wine, two pounds and a half.

First pour the alcohol on the root and barks, sliced and bruised, and, after twenty-four hours, add the wine; then macerate for seven days, and strain.

GENTIAN wine, which is a pleasant bitter, is intended as a substitute for the old *Tinctura ad Stomachicos.* Wines of this kind are sometimes introduced at the tables of epicures in Italy to assist the stomach in digestion.

VINUM IPECACUANHÆ. *Ed. Dub.*
Wine of Ipecacuanha.

Take of
- The root of ipecacuan, bruised, two ounces; (one part, *Ed.)*
- Spanish white wine, two pints, (fifteen parts, *Ed.)*

Digest for seven days, and strain.

Lond.

Take of
- Ipecacuan root, bruised, two ounces;
- Proof-spirit, twelve fluidounces;
- Distilled water, twenty fluidounces.

Macerate for fourteen days, and filter.

IPECACUAN wines are very mild and safe emetics, and equally serviceable, in dysenteries, with the root in substance. The common dose is an ounce, more or less, according to the age and strength of the patient.

VINUM NICOTIANÆ TABACI. *Ed.*
Tobacco Wine.

Take of
The dried leaves of tobacco, one part;
Sherry wine, twelve parts.
Macerate for seven days, and strain the liquor through paper.

WINE seems to extract more fully the active principles of the tobacco than either water or spirit taken separately.

VINUM OPII. *Ed.*
Wine of Opium.

Take of
Extract of opium, one ounce;
Cinnamon, bruised,
Cloves, bruised, of each one drachm;
Sherry wine, sixteen ounces.
Macerate for eight days, and filter.

THIS is the *Tinctura Thebaica* of the Dispensatory 1745; the *Laudanum liquidum* of Hoffman, which has continued to be popular, notwithstanding its exclusion from the late Pharmacopœias. Mr Ware, in particular, considers it as superior to every other solution of opium as an application in chronic inflammation of the eyes; and, with the same intention, it is sometimes used when inspissated by spontaneous evaporation.

VINUM RHEI. *Ed.*
Rhubarb Wine.

Take of
Russian rhubarb, sliced, two ounces;
Canella alba, bruised one drachm;
Weaker alcohol, two ounces;
Sherry wine, fifteen ounces.
Macerate for seven days, and strain through paper.

RHUBARB wine is a warm, cordial, laxative medicine. It is used chiefly in weakness of the stomach and bowels, and some kinds of loosenesses, for evacuating the offending matter, and strengthening the tone of the viscera. It may be given in doses of from half a spoonful to three or four spoonfuls or more, according to the circumstances of the disorder, and the strength of the patient.

VINUM VERATRI. *Lond.*
Wine of White Hellebore.

Take of
White hellebore root sliced, eight ounces;

Proof-spirit, a pint;
Distilled water, a pint and a half.
Macerate for fourteen days, and filter.

THIS preparation is now introduced, we are told by Dr Powell, "because it is a medicine usefully and extensively "employed in practice." This must be understood as applying only to London; for it is not yet known in Edinburgh, although there can be no doubt of its activity.

CHAP. XXXV.—EXTRACTS AND RESINS.

EXTRACT, in pharmacy, has long been used, in the common and true acceptation of the term, to express a thing exracted, and therefore it was applied to substances of all kinds xtracted from heterogeneous bodies, by the action of any menstruum, and again reduced to a consistent form, by the vaporation of that menstruum. Lately, however, Extract as been used in a different and much more limited sense, s the name for a peculiar principle, the saponaceous of Rouelle, the existence of which is now rendered very doubtul. It is in the former sense only that we have employed he term *Extract;* and for the new substance we proposed he term *Extractive*, which has been generally adopted.

The London College have also added to the confusion by xtending the term Extract to what are commonly called Inpissated juices, where no menstruum is employed.

Extracts are of various kinds, according to the nature of he substances from which they are obtained, and the mentruum employed; but they commonly consist of mucilaginous, resinous, saccharine, extractive, astringent, acid, and lkaline principles, more or fewer of them, mixed in various roportions.

Rouelle first classified extracts. He divided them into mucilaginous, saponaceous, and resinous. Subsequent chemists suggested additions and modifications. Braconnot deised a new classification, founded upon their elementary comosition; but it is too refined for our imperfect knowledge f the matter. Lastly, Recluz has divided them into six secons, with subdivisions of some of them.

I. *Alcaloid*, whose properties depend upon the presence of an organic alkali: the extracts of the cinchonas, papaveraceæ, strychneæ, solaneæ, colchicaceæ, hemlock, digitalis, &c.

II. *Resinoid*, deriving their characteristic properties from a resin: celandine, colocynth, convolvulus, turpethum, jalap, guaiac, elecampane, gratiola, euphorbiums, valerian, melambo, toxicodendron, oxgall, &c.

III. *Amaroid*, having the bitter or some analogous principle; as gentianin, caphopicrin, cathartin, elatin, tannin.

Ord. 1. Tonic bitters,—gentians, thistles, cichoracæ, corymbiferæ, quassias, saffron, eupatoriums, fumitory, soapwort, elder, &c.

—— 2. Cathartic,—senna, buckthorn, squill, elaterium, narcissus, &c.

—— 3. Astringent,—polygoneæ, tormentil, agrimony, tamarinds, potentilla, avens, acacia vera, acacia nostras, rhatany, alcornoque, hypocystis, catechu, kino, dwarf elder, walnut husk, alchemilla, calaguala, &c.

IV. *Saccharine*,—liquorice, logwood, cassia fistula, polypody, juniper, &c.

V. *Ozmazomous*,—portable soup, &c.

VI. *Polydiotous*,—whose virtues depend upon no predominant principle, but upon several united;—borage, white lily, dandelion, sarsaparilla, black hellebore, scurvy grass, &c.

The arrangement itself, but particularly the enumeration of the species, would admit of great improvement; but it has the advantage of forming a foundation which suggests examination, and admits of correction.

The preparation of extracts is a pharmaceutic problem of great importance and of considerable difficulty, and in regard to which there is still much to be learned. Its importance is demonstrated by the experiments of Orfila, who found that the extracts of the narcotic plants were highly deleterious when well prepared, and often quite inert as found in the shops. To give some method to our remarks, we may consider, 1. The preparation of the substance from which an extract is to be made; 2. The choice of a menstruum; 3. The mode of extraction; 4. The mode of inspissation; 5. The manner of preservation; and, 6. The tests of its goodness.

It is almost indifferent, with regard to the medicine, whether the subject be used fresh or dry, since nothing that can be preserved in this process will be lost by drying. On the contrary, some principles, generally inert, which are given out by the fresh herb, become nearly insoluble by drying, which is an advantage. With regard to the facility of extraction, however, there is a very considerable difference, vegetables in general giving out their active principles more readily when dried than when fresh.

In many cases, it is necessary to assist the action of the menstruum by mechanical division, but it should not be carried so far as to reduce the substance to a very fine powder; as Fabbroni found that cinchona, at least, yielded a larger proportion of extract when only coarsely powdered.

The menstrua most commonly employed are water and alcohol. Wine is also sometimes employed, but very improperly; for as a solvent it can only act as a mixture of alcohol and water; and the principles which it leaves behind, on evaporation, are rather injurious than of advantage to the extract.

Water is the menstruum most economically employed in making extracts, as it is capable of dissolving all the active principles except resin, and can have its solvent powers assisted by a considerable degree of heat. The chief objection to its use is, that it renders the principles extracted prone to decomposition, and requires immediate evaporation.

That the evaporation may be performed more quickly, and at less expense, the quantity of water ought to be no greater than is necessary for extracting the virtues of the subject. This point, however, is not very easily ascertained; for although some of the common principles of extracts be soluble in a very small proportion of water, there are others, of which water can dissolve only a certain proportion: besides, we have no very good method of knowing when we have used a sufficient quantity of water; for vegetable substances will continue to colour deeply successive portions of water, long after they are yielding little to it but colouring matter. One of the best methods is to act upon the subject with successive quantities of water, as long as the decoctions form a considerable precipitate with the test which is proper for detecting the substance we are extracting, such as a solution of gelatin for tannin, of subcarbonate of potass for the new alkalies, of alum for extractive, &c.

The temperature at which the extraction is made, is not indifferent. The solvent power of water, in regard to some principles, is much increased by increase of temperature, and accordingly boiling water will extract them in greater quantities and more quickly than cold. But, on the other hand, it is sufficient to effect some chemical changes, by coagulating and rendering insoluble certain principles soluble in cold water, and by giving rise to the formation of some insoluble compound by the union of principles in themselves soluble. Accordingly, although extracts are generally prepared from decoction, they are sometimes prepared by cold infusion, as in La Garay's method. The increased solvent power which water acquires from heat is a disadvantage whenever cold water is capable of dissolving the active ingredient, because it is thus more contaminated with mucilaginous and inert principles, which increase its quantity and impair its quality.

The action of the menstruum is always assisted by various modes of agitation; and very strong pressure, by means of a hydrostatic press, has been introduced by Real and Römershausen, but without any very evident advantage.

The mode of preparation has considerable influence on the product. Fresh fumitory gives, by maceration with water, twice the product of the expressed juice. M. Cadet de Vaux concluded from experiments made under his directions, that a larger quantity of extract was furnished by maceration and infusion than by decoction. M. Guibourt prosecuted the subject, and found that it was true in regard to some subjects, and not to others. It was true with regard to gentian and other substances not woody in their texture, and whose principles were readily soluble in water; but rhubarb gave the same weight of extract by infusion and by decoction, while cinchona bark and rhatany root gave more by decoction than by infusion; but the quality of the extract from decoctions was very inferior, containing a large proportion of tannate of starch insoluble in cold, whereas the extracts from infusions was almost entirely soluble in cold water. In general, Guibourt found that substances which contain starch yield more extract by decoction than by infusion.

If the extraction has been assisted by the boiling temperature, the decoction often becomes turbid on cooling, and lets fall a deposite when allowed to remain at rest. It is necessary to know of what principles this deposite is formed before we can determine whether it should be separated or not before we proceed to inspissation. It is very abundant from the astringent barks, and in them consists of tannate of starch, which is probably inert, and may be rejected with advantage to the preparation. Some pharmaceutists are not contented with separating the first deposite; but after the evaporation has proceeded a considerable length, they allow the thin extract to cool, and once more form deposite, which is also to be thrown away. This step is in all cases very doubtful; for, in some cases, the most active principle will in this way be rejected.

If the extraction has been performed by cold water, the infusions may either be boiled or evaporated at a considerably lower temperature. The ebullition is to be avoided if there be any volatile principle present which it is desirable to retain, or if there be great tendency to decomposition; but sometimes it is proper to bring the infusion to boil completely, when by that means we cause the coagulation of vegetable albumen and other inert principles, even if we should complete the inspissation at a much lower temperature.

With regard to the mode of conducting the inspissation itself, there can be little doubt that it ought to be completed as quickly as possible. The evaporation is accelerated, 1*st*, By exposing a large surface, and hence it is generally performed in broad shallow vessels; 2*dly*, By removing the vapour from the surface as fast as it is formed, either by a current of air blowing over it, or by inclosing it in a vessel along with sulphuric acid, or some other substance having a strong attraction for water; and in this way very perfect extracts on a small scale are now often prepared; 3*dly*, By causing ebullition in the evaporating fluid. In the open air this can only be effected at a temperature so high as to be dangerous to the success of the process; but by taking off the pressure of the atmosphere, as in Mr Barry's method, we can evaporate at a very greatly reduced temperature; and by combining the removal of atmospheric pressure with the rapid absorption of the vapour, as in Professor Leslie's method of freezing, we possess a method, although expensive, of making very perfect extracts.

If we evaporate by heat in the open air, when the matter begins to grow thick, great care is necessary to prevent its burning. This accident is almost unavoidable if the quantity be large, and the fire directly applied, as usual, under the evaporating basin. It may however be prevented by finishing the evaporation by a water or steam bath, or by pouring the extract, when it has acquired the consistence of a syrup, into shallow tin or earthen pans, and placing these before the fire, or in an oven with its door open, moderately heated; which, acting uniformly on every part of the liquid, will soon reduce it to any degree of consistence required. Even where a vapour or steam bath is used, the heat should be applied only to the bottom of the vessel, otherwise a thin crust is apt to form on the sides, which does not easily incorporate with the rest of the extract.

When the extracts are reduced to the desired degree of consistency, they should be put into pots of well-glazed earthenware of good quality; their surface should be covered either with a layer of melted white wax, or with a piece of paper wetted with strong spirits, which adheres closely to it, and prevents the direct contact of the air; the mouth of the vessel closed with a cork, over which wax or rosin should be spread, and the whole bound over with leather or bladder.

The inspissated juices almost all attract moisture from the air, and soon become very soft or even liquid. The extracts of the narcotics with chlorophylle, dry gradually, and in the course of some years become very solid. This drying seems to favour the molecular attraction of their crystallizable salts, and we find in them crystals of common salt, oxalate of lime, nitrate, sulphate, and muriate of potass. Some extracts prepared by digestion or decoction soon become solid, almost brittle, as those which contain amylaceous matter, such as liquorice, bryony, sarsaparilla. Extracts prepared from dry vegetables generally preserve the degree of consistence given to them.

Extracts should be totally free from empyreuma, a sour, musty or any foreign smell, and should not be black, but have a kind of fawn colour, although deep, and should be uniform in appearance throughout.

Alcohol is much too expensive to be employed as a menstruum for obtaining extracts, except in those cases where water is totally inadequate to the purpose. These cases are

1*st*, When the nature of the extract is very perishable when dissolved in water, so that it is liable to be decomposed before the evaporation can be completed, especially if we cannot proceed immediately to the evaporation.

2*dly*, When water is totally incapable of dissolving the substance to be extracted; and,

3*dly*, When the substance extracted can bear the heat of boiling alcohol without being evaporated, but would be dissipated by that of boiling water; that is, when it requires a heat greater than 176°, and less than 212°, for its evaporization.

In the first case, the alcohol may be very weak, or rather, the addition of a small proportion of alcohol to water will be sufficient to retard or prevent the decomposition of the solution. In the second case, the alcohol need not be very strong, because it is capable of dissolving resinous substances, although diluted with a considerable proportion of vater. In this way the alcoholic extract of some aromatic ubstances, as cinnamon, lavender, rosemary, retain a coniderable degree of their fine flavour. In the last case, the lcohol must be perfectly free from water, because the heat ecessary to evaporate it at the end of the process would rustrate the whole operation. Hence, also, the subject itself ught always to be dry: those substances, which lose their irtue by drying, lose it equally on being submitted to this reatment with the purest alcohol.

The alcohol employed in all these cases should be perectly free from any unpleasant flavour, lest it be communiated to the extract.

When a larger or smaller proportion of alcohol is conined with the water in preparing some extracts, there is a arger product, and equally efficacious; thus, wormwood nd chamomile give three times as much extract to a spirious menstruum as to water; on the contrary, gentian and affron furnish more soluble matter to water than to spirit f any degree of strength.

The inspissation of these alcoholic solutions should be erformed from the beginning in the gentle heat of a waterath. We need not suffer the alcohol to evaporate in the ir: the greatest part of it may be recovered by collecting he vapour in common distilling vessels. If the distilled pirit be found to have brought over any flavour from the ubject, it may be advantageously reserved for the same puroses again.

When diluted alcohol is employed, the distillation should nly be continued as long as alcohol comes over; and the vaporation should be finished in wide open vessels, as the vatery extracts.

In this chapter, we have also included the processes inended for purifying inspissated juices and resinous subtances. Pure resins are prepared, by adding, to spiritous inctures of resinous vegetables, a large quantity of water. The resin, incapable of remaining dissolved in the watery iquor, separates and falls to the bottom; leaving in the nenstruum such other principles of the plant as the spirit night have extracted at first along with it. But this is ony practised for the purpose of analysis.

EXTRACTA PER AQUAM. *Ed.*
Extracts made with Water.

Having cut and bruised the substance from which the extract is to be made, pour upon it eight times its weight of distilled water. Boil to the consumption of one-half of the liquor, and strain it by strong expression. Evaporate the decoction immediately, to the consistence of thick honey, in a bath of water saturated with muriate of soda.

EXTRACTA. *Lond.*
Extracts.

In preparing all extracts, evaporate the fluid in a pan, placed in a water-bath, as quickly as possible, until it become of a proper thickness for forming into pills, stirring it constantly towards the end with a spatula.

Sprinkle a little Rectified Spirit on all softer extracts.

EXTRACTA SIMPLICIORA. *Dub.*
Simple Extracts.

ALL simple extracts, unless otherwise ordered, are to be prepared according to the following rule:

The vegetable matter is to be boiled in eight times its weight of water, to one-half; the liquor is then to be expressed, and, after the fæces have subsided, to be filtered; it is then to be evaporated with a heat between 200° and 212°, until it becomes thickish; and, lastly, it is to be evaporated with a heat less than 200°, and frequently stirred, until it acquire consistence proper for forming pills.

All extracts, when they begin to get thick, ought to be frequently stirred with a clean iron spatula. They may be reduced to a proper thickness by means of a stove, heated on purpose.

They ought to be preserved as much as possible from the contact of the air, and the softer ones are to be sprinkled with rectified spirit.

In this manner are prepared the following officinal Extracts:

EXTRACTUM	Extract of
ABSINTHII. *Dub.*	Wormwood, from the tops.
GLYCYRRHIZÆ. *Dub.*	Liquorice, from the root.
HELLEBORI NIGRI. *Ed. Dub.*	Black Hellebore, from the root, bruised.
GENTIANÆ LUTEÆ. *Ed.*	Gentian, from the root, sliced and bruised.
GENTIANÆ. *Dub.*	
JALAPÆ. *Dub.*	Jalap, from the root.
RUTÆ GRAVEOLENTIS. *Ed.*	Rue, from the herb.
RUTÆ. *Dub.*	
SABINÆ. *Dub.*	Savin, from the leaves.
ANTHEMIDIS NOBILIS. *Ed*	Chamomile, from the dried flowers.
CHAMÆMELI. *Dub.*	

EXTRACTUM	Extract of
PAPAVERIS SOMNIFERI. *Ed.*	Poppy, from the capsules, bruised after taking out the seeds.
GENISTAE. *Dub.*	Broom tops.
HÆMATOXYLI CAMPECHIANI. *Ed.* HÆMATOXYLI. *Dub.*	Logwood, from the rasped wood.
QUERCUS. *Dub.*	Oak bark.
TARAXACI. *Dub.*	Dandelion, from the herb and root.

EXTRACTUM ALOES PURIFICATUM. *Lond.*

Purified Extract of Aloes.

Take of

Socotorine aloes, in powder, one pound;
Boiling water, a gallon.

Macerate in a gentle heat for three days, then strain, and set it at rest till the fæces subside. Pour off the clear liquor, and evaporate to a proper thickness.

THIS is supposed to be less irritating than the aloes itself, but it appears to be an unnecessary refinement.

EXTRACTUM ANTHEMIDIS. *Lond.*

Extract of Chamomile.

Take of

Chamomile flowers, dried, one pound;
Water, one gallon.

Boil down to four pints, and filter the liquor while hot. Then evaporate to a proper thickness.

EXTRACTUM CINCHONÆ. *Lond.*

Extract of Cinchona.

Take of

Lance-leaved cinchona bark, bruised, one pound;
Water, one gallon.

Boil to six pints, and filter the liquor while hot. With the same quantity of water, and in the same manner, repeat the boiling and filtration four times. Then reduce all these liquors, mixed together, to a proper thickness, by evaporation.

This extract must be kept in two forms; one *soft*, and fit for making pills; the other *hard* and pulverizable.

EXTRACTUM CINCHONÆ. *Dub.*
Extract of Cinchona.

Take of
Cinchona, in coarse powder, one pound;
Water, six pints.

Boil, for a quarter of an hour, in a vessel almost covered; filter the decoction while hot through linen, and set it aside. Boil the residuum again, in the same quantity of water, and filter it in the same manner. This may be repeated a third time, and all the decoctions are to be mixed and reduced to a proper degree of thickness by evaporation.

This extract ought to be kept in two states; one *soft*, adapted for making pills; and the other *hard*, capable of being pulverised.

CADET DE VAUX got from boiling one pound of bruised cinchona bark for ten minutes in six pints of water, two ounces of a brownish, grumous extract. The same quantity gave him by infusion two ounces, two drachms of a smooth extract of a fine red colour. Guibourt's experiments did not correspond with these as to quantity, but completely as to quality.

EXTRACTUM COLOCYNTHIDIS. *Lond.*
Extract of Colocynth.

Take of
Pulp of colocynth, one pound;
Water, one gallon.

Boil to four pints, and filter the liquor while hot. Lastly, evaporate to a proper thickness.

Mr Phillips says, that it is scarcely possible to boil the colocynth in the assigned quantity of water, and that the extract obtained is remarkably spongy, and very soon becomes hard and mouldy.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Dub.*
Compound Extract of Colocynth.

Take of
Pith of colocynth, cut small, six drachms;
Hepatic aloes, one ounce and a half;
Scammony, half an ounce;
Lesser cardamom seeds, husked, one drachm;
Castile soap, softened with warm water, so as to have a gelatinous consistence, three drachms;
Warm water, one pint.

Digest the colocynth in the water, in a covered vessel, with a moderate heat, for four days. To the liquor, expressed and filtered, add the aloes and scammony, separately reduced to powder: then evaporate the mixture to a proper thickness for making pills, having added, towards the end of the evaporation, the soap-jelly and powdered seeds; and mix all the ingredients thoroughly together.

EXTRACTUM GENTIANÆ. *Lond.*
Extract of Gentian.

Take of
- Gentian root, one pound;
- Boiling water, one gallon.

Macerate for twenty-four hours; then boil down to four pints, and filter the liquor while still hot; lastly, evaporate it to a proper thickness.

GUIBOURT, as well as Cadet de Vaux, got both a larger quantity of extract from gentian root by infusion than by decoction, and the extract was smoother, more transparent, bitterer, and had more of the colour and smell of the root, so that there is no comparison between the two modes of extraction in this instance.

EXTRACTUM GLYCYRRHIZÆ. *Lond.*
Extract of Liquorice.

Take of
- Liquorice root, sliced, one pound;
- Boiling water, one gallon.

Macerate for twenty-four hours; then boil down to four pints, and filter the liquor while still hot; lastly, evaporate it to a proper thickness.

EXTRACTUM HÆMATOXYLI. *Lond.*
Extract of Logwood.

Take of
- Logwood, bruised, one pound;
- Boiling water, one gallon.

Macerate for twenty-four hours, then boil to four pints.—Strain the liquor while hot, and evaporate to a proper consistence.

EXTRACTUM HUMULI. *Lond.*
Extract of Hops.

Take of
- Hops, four ounces;

Water, boiling, a gallon.

Boil down to four pints, strain the hot liquor, and evaporate it to a proper consistence.

In the former edition 1809, the quantity of hops was half a pound, in regard to which Mr Phillips says that the proportion of water ordered was considerably too small. It has accordingly been corrected.

EXTRACTUM LACTUCÆ. *Lond.*
Extract of Lettuce.

Take of

Fresh lettuce leaves, one pound.

Bruise in a stone mortar, sprinkling on a little water, and evaporate it without separating the sediment, until it acquire the proper consistence.

This preparation should have been inserted among the inspissated juices, as no menstruum is applied to extract its soluble parts. It differs totally from the concrete juice which exudes from incisions, and consists chiefly of the common sap inspissated, containing very little of the milky secretion, and will have the same relation to *Lactucarium*, that the expressed juice of the poppy plant inspissated would have to *Opium*.

EXTRACTUM OPII AQUOSUM. *Dub.*
Watery Extract of Opium.

Take of

Opium, two ounces;

Boiling water, one pint.

Triturate the opium in the water, for ten minutes; then, after waiting a little, pour off the liquor, and triturate the remaining opium with the same quantity of boiling water, pouring off the infusion in the same manner. This may be repeated a third time. Mix the decanted liquors, and expose the mixture to the air, in an open vessel, for two days. Lastly, filter through linen, and, by slow evaporation, form an extract.

EXTRACTUM OPII. *Lond.*
Extract of Opium.

Take of

Opium, sliced, sixteen ounces;

Water, one gallon.

Add a small quantity of the water to the opium, and macerate for twelve hours, that it may soften; then, having gradually added the rest of the water, triturate them, until they become thoroughly mixed, and set the mixture at rest until the fæces subside. Then filter the liquor, and evaporate to a proper thickness.

EXTRACTUM PAPAVERIS. *Lond.*
Extract of Poppy.

Take of
Poppy heads, bruised, without the seeds, one pound;
Boiling water, a gallon.

Macerate for twenty-four hours; then boil to four pints; strain the liquor while hot, and evaporate to a proper thickness.

EXTRACTUM SARSAPARILLÆ. *Lond.*
Extract of Sarsaparilla.

Take of
Sarsaparilla root, sliced, one pound;
Boiling water, one gallon.

Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

EXTRACTUM STRAMONII. *Lond.*
Extract of Thorn Apple.

Take of
Thorn apple seeds, one pound;
Boiling water, one gallon.

Macerate for four hours in a loosely covered vessel near the fire; then take out the seeds, and bruise them in a stone mortar, and when bruised, return them into the liquor. Then boil down to four pints, and filter, while still hot. Lastly, evaporate to a proper consistence.

THE seeds of the stramonium contain the narcotic principle in an uniform state of concentration, and therefore answer well as the basis of its preparations. It was the extract of the seeds that Dr Marcet found so efficacious in allaying pain, and I have found it equally successful.

EXTRACTUM TARAXACI. *Lond.*
Extract of Dandelion.

Take of
Fresh dandelion root, bruised, one pound;
Boiling water, one gallon.

Macerate for twenty-four hours; then boil to four pints, and filter the liquor while hot; lastly, evaporate to a proper thickness.

EXTRACTUM VALERIANÆ. *Dub.*
Extract of Valerian.

Take of
Valerian root, in coarse powder, six ounces;
Boiling water, three pints.

Mix and digest, with a moderate heat, for twenty-four hours, in a covered vessel; then express the liquor, and evaporate it to a proper thickness.

EXTRACTA PER AQUAM ET ALCOHOL. *Ed.*
Extracts made with Alcohol.

Upon the substance to be extracted, in powder, pour four times its weight of stronger alcohol. Digest for four days, and pour off the tincture. Boil the residuum in five pounds of distilled water, for fifteen minutes, and filter the decoction, boiling hot, through linen. Repeat this decoction, and filtration, with the same quantity of distilled water, and reduce the liquor, by evaporation, to the consistence of thin honey. Draw off the alcohol from the tincture, by distillation, until it also become thick: then mix the liquors, thus inspissated, and evaporate them in a bath of boiling water, saturated with muriate of soda, to a proper consistency.

In this way are prepared,

EXTRACTUM CINCHONÆ LANCIFOLIÆ. *Ed.*
Extract of Cinchona, from the bark.

EXTRACTUM CONVOLVULI JALAPÆ. *Ed.*
Extract of Jalap, from the root.

EXTRACTUM CINCHONÆ RESINOSUM. *Lond.*
Resinous Extract of Cinchona.

Take of
Lance-leaved cinchona, bruised, two pounds;
Rectified spirit of wine, one gallon.

Macerate for four days, and strain; distil the tincture, in a water-bath, to a proper thickness.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. *Lond.*
Compound Extract of Colocynth.

Take of
Pulp of colocynth, sliced, six ounces;

Socotorine aloes, in powder, twelve ounces;
Scammony, in powder, four ounces;
Cardamom seeds, powdered, one ounce;
Hard soap, three ounces;
Proof-spirit, one gallon.

Macerate the pulp of colocynth in the spirit, with a gentle heat, for four days. Strain the liquor, and add to it the aloes, scammony and soap. Then evaporate to a proper thickness, adding, towards the end of the operation, the cardamom seeds.

EXTRACTUM RHEI. *Lond.*
Extract of Rhubarb.

Take of
Rhubarb root, in powder, one pound;
Proof-spirit, one pint;
Water, seven pints.

Macerate, with a gentle heat, for four days; then filter, and set it aside until the fæces subside. Pour off the liquor clear, and evaporate to a proper thickness.

RHUBARB yields nearly the same quantity of extract to infusion and to decoction, but the former is infinitely preferable. It is finer, more soluble in water, less mucilaginous, and certainly more active. By decoction the starch is dissolved, which forms with the tannin a compound insoluble when cold, and an equal quantity of the active principle is combined with the woody fibre, and is not dissolved.

EXTRACTUM JALAPÆ. *Lond.*
Extract of Jalap.

Take of
Jalap, in powder, one pound;
Rectified spirit, four pints;
Water, one gallon.

Macerate the jalap in the spirit, for four days, and pour off the tincture. Boil the residuum in the water to two pints. Then filter the tincture and decoctions separately; evaporate the latter, and distil the former until both grow thick; lastly, mix the extract with the resin, and evaporate to a proper thickness.

This extract is to be kept in two states; one *soft*, proper for making pills, and one *hard*, and pulverizable.

EXTRACTUM CASCARILLÆ RESINOSUM. *Dub.*
Resinous Extract of Cascarilla.

Take of

Cascarilla, in coarse powder, one pound;
Rectified spirit of wine, four pints.

Digest for four days; then pour off the tincture, and strain; boil the residuum, in ten pints of water, to two; evaporate the filtered decoction, and distil the tincture, in a retort, till both begin to grow thick; then mix them, and evaporate them to a state fit for making pills. Lastly, they are to be intimately mixed.

In this way are prepared,

EXTRACTUM CINCHONÆ RUBRÆ RESINOSUM. *Dub.*
Resinous Extract of Red Cinchona Bark.

EXTRACTUM JALAPÆ RESINOSUM. *Dub.*
Resinous Extract of Jalap.

OPIUM PURIFICATUM. *Dub.*
Purified Opium.

Take of

Opium, cut into small pieces, one pound;
Proof-spirit of wine, twelve pints.

Digest with a gentle heat, stirring now and then till the opium be dissolved; filter the liquor through paper, and distil in a retort until the spirit be separated: Pour out the liquor which remains, and evaporate, until the extract acquires a proper thickness.

Purified opium must be kept in two forms; one *soft*, proper for forming into pills; the other *hard*, capable of being reduced into powder.

Lond.

Separate opium very carefully from all heterogeneous matters, especially those adhering to it on the outside. Opium is to be kept in two states; one *soft*, fit for making pills; and another *hard*, dried in a water-bath, until it become pulverizable.

ALL these extracts are supposed to contain the virtues of the substances from which they are prepared, in a very pure and concentrated form; but this supposition is, probably in several instances, erroneous; and the directions for preparing them are frequently injudicious and uneconomical.

As the changes which opium and aloes undergo by solution, and subsequent evaporation, have never been ascertained by careful and satisfactory experiments, well-selected pieces of these substances are to be preferred to the preparations in which they are supposed to be purified. As a farther proof of the superiority of good opium over all its preparations, I may also remark, that the latter, however well prepared, soon become mouldy, the former never does.

Mr Phillips, however, prefers the preparing of an extract of opium, by first submitting it to the action of boiling water, as long as any portion of it continues to be dissolved, and then digesting the residuum in rectified spirit, and mixing the watery and alcoholic extracts thus obtained. He found, that 72 parts of opium, dried by steam till it became pulverizable, yielded to cold water 30 parts, then to boiling water 9, and lastly, to alcohol 7. The cold infusion was of a deep brownish-red colour, remained transparent, and smelt strongly of opium; the decoction was of a pale brown colour, deposited on cooling the greater part of what had been dissolved, and had no smell of opium; and the tincture very much resembled common tincture of opium, and furnished, on the addition of water, an abundant yellowish-white precipitate. Dr Powell also says, that proof-spirit by heat dissolves 9-12ths of opium; and water, although heated, only 5-12ths.

The real advantage of so expensive an agent as alcohol, in preparing any of these extracts, has not been demonstrated; and, if I be not misinformed, it is seldom employed by the apothecaries in preparing even what are called the Resinous Extracts.

RESINA FLAVA. *Dub.*
Yellow Resin.

This remains in the retort after the distillation of oil of turpentine.

TURPENTINES are combinations of volatile oil and resin, which are easily separated by distillation. The process, however, cannot be carried so far as to separate the whole of the oil, without charring and burning part of the resin. In this state it has a brown colour, and a certain degree of transparency, and is well known under the name of Fiddlers Rosin. But if water be added to the residuum of the distillation, and be thoroughly mixed with it by agitation, it becomes opaque, and is called Yellow Rosin.

Yellow rosin is a useful ingredient in the composition of plasters and hard ointments.

GUMMI RESINÆ. *Lond.*

Gum Resins.

Those gum-resins are to be reckoned the best which are selected so pure that they do not stand in need of purification. But if they seem impure, boil them in water until they grow soft; then squeeze them through a canvas bag, by means of a press. Let them remain at rest till the resinous part subside; then evaporate in a water-bath, the part of the water decanted off; and towards the end of the evaporation, mix the resinous part with the gummy into a homogeneous mass.

Gum-resins which melt easily may be purified by putting them into an ox-bladder, and holding it in boiling water till they become so soft that they can be separated from impurities by pressing them through a hempen cloth.

As one, and perhaps the most active, constituent of gummy resins, as they are called, is of a volatile nature, it is evident that it must be, in a great measure, dissipated in the process just described, and that we cannot expect, in these substances after they are purified, the same virtues which they possess in their crude state. This process is, therefore, contrary to the principles of good pharmacy; and such specimens of these gummy resins as stand in need of it to give them an apparent degree of purity, should not be admitted into the shop of the apothecary. Besides, many of the impurities which they usually contain are easily separated, in compounding the preparations or extemporaneous prescriptions into which they enter.

STYRAX PURIFICATA. *Lond.*

Purified Storax.

Dissolve storax in rectified spirit of wine, and filter; afterwards reduce the balsam to a proper thickness, by distilling off the spirit with a gentle heat.

Dub.

Digest the storax in water, with a low heat, until it get soft; then express it between iron plates, heated with boiling water; and, lastly, separate it from the water.

STORAX is a balsam, or combination of resin and benzoic acid, both of which are soluble in alcohol, and neither of them volatile in the heat necessary for evaporating alcohol. The London process for purifying it is therefore not liable to any chemical objections. The method now directed by the Dublin College is certainly more economical, but must be attended with loss of benzoic acid.

CHAP. XXXVI.—POWDERS.

THIS form is proper for such materials only as are capable of being sufficiently dried to become pulverizable, without the loss of their virtue. There are several substances, however, of this kind, which cannot be conveniently taken in powder; bitter, acrid, fetid drugs are too disagreeable; emollient and mucilaginous herbs and roots are too bulky; pure gums cohere, and become tenacious in the mouth; potash deliquesces when exposed to the air; volatile alkali exhales, and soda effloresces. Many of the aromatics, and too, suffer a great loss of their odoriferous principles when kept in powder, as in that form they expose a much larger surface to the air.

The dose of powders, in extemporaneous prescription, is generally about half a drachm; it rarely exceeds a whole drachm; and is not often less than a scruple. Substances which produce powerful effects in small doses are not exhibited in this form, unless their bulk be increased by additions of less efficacy: those which require to be given in larger doses are better fitted for other forms.

The most useful vehicle for taking the lighter powders is any agreeable thin liquid. The ponderous powders, particularly those prepared from metallic substances, require a more consistent vehicle, as syrups or conserves; for from thin ones they soon subside. Resinous substances, likewise, are most commodiously taken in thick liquors; for in thin ones they are apt to run into lumps, which are not easily diffused.

IN PULVEREM TRITI. *Dub.*
Powders.

Substances to be powdered, previously dried, are to be pulverized in an iron-mortar. The powder is then to be separated, by shaking it through an hair-sieve, and is to be kept in close vessels.

PULVIS ALOES CUM CANELLA. *Dub.*
Powder of Aloes with Canella.

Take of
  Hepatic aloes, one pound;
  White canella, three ounces.
Powder them separately, and then mix them.

THIS was formerly well known by the title of *Hiera Picra.* The spicy canella acts as a corrigent to the aloes, but the compound is more adapted to the form of pills, than of powder.

PULVIS ALOES CUM GUAIACO. *Dub.*
Powder of Aloes with Guaiac.

Take of
  Hepatic aloes, one ounce and a half;
  Gum guaiacum, one ounce;
  Aromatic powder, half an ounce.
Rub the aloes and gum guaiacum separately to powder; then mix them with the aromatic powder.

PULVIS ALOES COMPOSITUS. *Lond.*
Compound Powder of Aloes.

Take of
  Socotorine aloes, one ounce and a half;
  Gum-resin guaiac, one ounce;
  Compound powder of cinnamon, half an ounce.
Powder the aloes and guaiac separately; then mix the compound powder of cinnamon with them.

THIS powder is supposed to combine the sudorific effects of the guaiac with the purgative of the aloes.

PULVIS AROMATICUS. *Dub.*
Aromatic Powder.

Take of
  Cinnamon, two ounces;
  Smaller cardamom seeds, husked,
  Ginger,
  Long pepper, of each one ounce.
Rub them together to a powder.

Ed.

Take of
  Cinnamon bark,
  Smaller cardamom seeds,
  Ginger root, each equal parts.

Reduce them to a very fine powder, which is to be kept in a glass vessel, well closed.

PULVIS CINNAMOMI COMPOSITUS. *Lond.*
Compound Powder of Cinnamon.

Take of
Cinnamon bark, two ounces;
Cardamom seeds, an ounce and a half;
Ginger, one ounce;
Long pepper, half an ounce.
Reduce them together to a very fine powder.

THESE compositions are hot carminatives. The dose is from ten grains to a scruple and upwards. The first and third, from the long pepper which they contain, are more pungent than the second.

PULVIS ASARI COMPOSITUS. *Ed.*
Compound Powder of Asarabacca.

Take of
The leaves of asarabacca, three parts;
———————— marjoram,
Flowers of lavender, of each one part.
Rub them together to powder.

Dub.

Take of
Dried leaves of asarabacca, one ounce;
Lavender flowers, two drachms.
Powder them together.

THESE are agreeable and efficacious errhines. They are often employed with great advantage in cases of obstinate headach, and of ophthalmia resisting other modes of cure. Snuffed up the nostrils, to the extent of five or six grains at bed-time, they will operate the succeeding day as a powerful errhine, inducing frequent sneezing, and likewise a copious discharge.

PULVIS CARBONATIS CALCIS COMPOSITUS. *Ed.*
Compound Powder of Carbonate of Lime.

Take of
Prepared carbonate of lime, four ounces;
Nutmeg, half a drachm;
Cinnamon bark, one drachm and a half.
Reduce them together to powder.

PULVIS CRETÆ COMPOSITUS. *Lond.*
Compound Powder of Chalk.

Take of
- Prepared chalk, half a pound;
- Cinnamon bark, four ounces;
- Tormentil root,
- Gum arabic, of each three ounces;
- Long pepper, half an ounce.

Reduce them separately to a very fine powder, and mix them.

THE addition of the aromatics coincides with the general intention of the remedy, which is indicated in weakness and acidity of the stomach, and in looseness from acidity.

PULVIS CRETÆ COMPOSITUS CUM OPIO. *Lond.*
Compound Powder of Chalk with Opium.

Take of
- Compound powder of chalk, six ounces and a half;
- Hard opium, in powder, four scruples.

Mix them.

THE addition of the opium adds to the efficacy of the chalk, when diarrhœa proceeds from irritation of the intestinal canal. Two scruples contain a grain of opium.

PULVIS CONTRAYERVÆ COMPOSITUS. *Lond.*
Compound Powder of Contrayerva.

Take of
- Contrayerva root, in powder, five ounces;
- Prepared oyster-shells, one pound and a half.

Mix them.

THIS composition is quite obsolete. It may be considered as another form of exhibiting carbonate of lime with a weak aromatic.

PULVIS IPECACUANHÆ ET OPII. *Ed.*
Powder of Ipecacuan and Opium.

Take of
- Ipecacuan root, in powder,
- Opium, of each one part;
- Sulphate of potass, eight parts.

Triturate them together into a fine powder.

PULVIS IPECACUANHÆ COMPOSITUS. *Lond.*
Compound Powder of Ipecacuan.

Take of
- Ipecacuan root, in powder,

Hard opium, in powder, each one drachm;
Sulphate of potass, in powder, one ounce.
Mix them.

In this composition the sulphate of potass is probably added to assist in dividing the opium, when it is not previously powdered, and to give sufficient bulk to a dose of the active ingredients. Ten grains of the compound powder contain one of opium, and one of ipecacuan, which may be considered as a full dose of the former, but not above the fifth part of an emetic dose of the latter. Accordingly, when I did not think it advisable to increase the dose of the opium, I have frequently increased the dose of the ipecacuan with good effect.

As it is, this powder is one of the most certain sudorifics, and as such was recommended by Dr Dover, as an effectual remedy in rheumatism. Modern practice confirms its reputation, not only in rheumatism, but also in dropsy, and several other diseases, where it is often difficult, by other means, to produce a copious sweat. The dose is from five to twenty grains, according as the patient's stomach and strength can bear it. It is proper to avoid much drinking immediately after taking it, otherwise it may be rejected by vomiting before any other effects are produced.

PULVIS JALAPÆ COMPOSITUS. *Ed.*
Compound Powder of Jalap.

Take of
Jalap root, in powder, one part;
Supertartrate of potass, two parts.
Grind them together to a very fine powder.

The pharmaceutic use of the tartar in this preparation is to assist in dividing the jalap; and therefore they are directed to be triturated together, and not separately, but it also modifies its effect.

PULVIS KINO COMPOSITUS. *Lond.*
Compound Powder of Kino.

Take of
Kino, fifteen drachms;
Cinnamon, half an ounce;
Hard opium, one drachm.
Reduce them separately to a very fine powder, then mix them.

This is a convenient officinal preparation. It is anodyne and astringent, containing one part of opium in twenty.

PULVIS OPIATUS. *Ed.*
Opiate Powder.

Take of
  Opium, one part;
  Prepared carbonate of lime, nine parts.
Rub them together to a fine powder.

PULVIS CORNU CERVI cum OPIO. *Lond.*
Powder of Hartshorn with Opium.

Take of
  Hard opium, in powder, one drachm;
  Hartshorn, burnt and prepared, one ounce;
  Cochineal, in powder, one drachm.

In these powders, the opium is the active ingredient; and it is immaterial whether the phosphate or carbonate of lime be used to facilitate its mechanical division.

PULVIS SALINUS COMPOSITUS. *Ed.*
Compound Saline Powder.

Take of
  Muriate of soda,
  Sulphate of magnesia, of each four parts;
  Sulphate of potass, three parts.
Dry the salts with a gentle heat, reduce them to fine powder separately, then rub them together, and keep the mixture in a well-corked phial.

However we may explain it, there is little doubt that mixtures of substances of similar characters have often a better effect than either of the ingredients singly, as is clearly shewn in the superior efficacy of the natural mineral waters. This mixture of salts acts very pleasantly in costive habits, being taken to the extent of a tea-spoonful in half a pint of water before breakfast.

PULVIS SCAMMONEÆ COMPOSITUS. *Lond.*
Compound Powder of Scammony.

Take of
  Scammony,
  Hard extract of jalap, of each two ounces;
  Ginger root, half an ounce.

Reduce them separately to a very fine powder, and mix them.

PULVIS SCAMMONII COMPOSITUS. *Ed.*
Compound Powder of Scammony.

Take of
Resin of scammony,
Supertartrate of potass, equal parts,
Rub them together to a very fine powder.

In the former of these compositions, the scammony is combined with another purgative little less active than itself, and in the latter with one much less so; which difference must be attended to in prescription. The ginger in the former is an useful addition, and will render it less apt to gripe.

PULVIS SENNÆ COMPOSITUS. *Lond.*
Compound Powder of Senna.

Take of
Senna leaves,
Supertartrate of potass, of each two ounces;
Scammony gum resin, half an ounce;
Ginger, two drachms.
Triturate the scammony by itself, reduce the rest together into a very fine powder, and then mix.

This powder is given as a cathartic, in the dose of two scruples or a drachm. The scammony is used as a stimulus to the senna powder; the quantity of the latter necessary for a dose, when not assisted by some more powerful substance, being too bulky to be conveniently taken in this form. The ginger is added to make it sit easier on the stomach, and gripe less.

PULVIS ALUMINIS COMPOSITUS. *Ed.*
Compound Powder of Alum.

Take of
Alum, four parts;
Kino, one part.
Rub them together to a fine powder.

This powder is composed of two very powerful astringents, but we doubt whether they be combined with propriety; at least it is certain that a solution of alum is decomposed by a solution of kino.

PULVIS TRAGACANTHÆ COMPOSITUS. *Lond.*
Compound Powder of Tragacanth.

Take of
  Tragacanth, powdered,
  Gum arabic, powdered,
  Starch, of each one ounce and a half;
  Refined sugar, three ounces.

Powder the starch and sugar together: then add the tragacanth and gum arabic, and mix.

THIS composition is serviceable in hectic cases, tickling coughs, strangury, some kind of alvine fluxes, and other disorders proceeding from diseased mucous membranes with acrid or morbid secretion. The dose is from half a drachm to two or three drachms, which may be frequently repeated.

CHAP. XXXVII.—CONSERVES, ELECTUARIES AND CONFECTIONS.

If confections have become hard by being long kept, they are to be moistened with water to restore their original consistence. *Lond.*

CONSERVES are compositions of recent vegetable matters, and sugar, beaten together into a uniform mass.

This process is introduced for preserving certain simples, undried, in agreeable form, with as little alteration as possible in their native virtues. Vegetables may in this form be kept uninjured for a considerable time; for by carefully securing the mouth of the containing vessel, the alteration, as well as dissipation, of their active principles, is generally prevented; and the sugar preserves them from the corruption which juicy vegetables would otherwise undergo.

The sugar should be pounded and passed through a sieve, before it be mixed with the vegetable mass; for otherwise it cannot be properly incorporated. Rose buds, and some other vegetables, are prepared for mixing with the sugar, by grinding them in a small wooden mill.

There are, however, vegetables whose virtues are impaired by this treatment. Mucilaginous substances gradually become less glutinous; and astringents sensibly become softer upon the palate. Many of the fragrant flowers are of so tender and delicate a texture, as almost entirely to lose their peculiar qualities on being beaten or bruised.

In general, it is obvious, that in this form, on account of the large proportion of sugar, only substances of considerable activity can be taken with advantage as medicines. And, indeed, conserves are at present considered chiefly as vehicles for medicines of greater efficacy. They are very convenient for reducing into bolusses or pills the more ponderous powders, as submuriate of mercury, the oxides of iron, and other mineral preparations, which, with liquid or less consistent matters, as syrups, will not cohere.

The few conserves now retained have in general either an agreeable flavour to recommend them, or are capable of answering some useful purposes as medicines. Their common dose is the bulk of a nutmeg, or as much as can be taken up at once or twice upon the point of a knife. There is, in general, no great danger of exceeding in the dose.

Electuaries are composed chiefly of powders mixed up with syrups, &c. into such a consistence that the mass shall neither be too stiff to swallow, nor so thin as to allow the powders to separate, and that a dose may be easily taken up on the point of a knife.

In making electuaries, powders from vegetables and other

dry substances, - -	1 part absorbs of syrup	3 parts.
Of gum resins -	1	1
Of resins - -	1	$\frac{3}{4}$
Of mineral substances which do not absorb water, as antimony and calomel, -	1	$\frac{1}{2}$
Of salts, - -	1	$\frac{1}{2}$
Of alkalies and salts which deliquesce spontaneously,	1	$\frac{1}{10}$
Officinal extracts and electuaries, - -		0

But those substances, after being mixed, often become in short time so changed by mutual reaction, that the syrup added is absorbed, and a new quantity requires to be sucessively added for several times, to enable it to retain a proper degree of consistence. Thus, in associating in a conection supertartrate of potash and pure iron-filings, for one part of each, at first one part of syrup will be sufficient; on the following day another part must be added; and, at ast, after three days, a third part will be required, in order o preserve the electuary of a proper consistence.

Where common syrups are employed, the compound is pt to candy and dry too soon; electuaries of peruvian bark, for instance, made up with syrup alone, will often in a day or two grow too dry for use. This is owing to the crystallization of the sugar. Deyeux, therefore, advises electuaries, confections, and conserves, to be made up with syrups, from which all the crystallizable parts have been separated. In hospital practice, the same object may be obtained much more easily by using molasses instead of syrups, and in private practice, by the substitution of a little conserve.

The quantity of an electuary directed at a time in extemporaneous prescription varies much, according to its constituent parts; but is rarely less than the size of a nutmeg, or more than two or three ounces.

CONFECTIO AMYGDALARUM. *Lond.*
Confection of Almonds.

Take of
Sweet almonds, one ounce;
Gum arabic in powder, one drachm;
Refined sugar, half an ounce.

Having first blanched the almonds, by macerating them in water, and peeling them, beat the whole ingredients into a homogeneous mass.

THIS is a very convenient confection; for by triturating it with water, we immediately form an almond emulsion, which on many occasions is desirable, as it takes a considerable time to make it from the unmixed materials, and soon spoils after it is made.

CONFECTIO AURANTIORUM. *Lond.*
Confection of Orange-peel.

Take of
Fresh orange-peel, grated off, one pound;
Refined sugar, three pounds.

Bruise the peel in a stone mortar with a wooden pestle; then, adding the sugar, beat them into a homogeneous mass.

CONSERVA AURANTII. *Dub.*
Conserve of Orange-peel.

To the fresh rind of Seville oranges, grated off, add three times its weight of refined sugar, while beating it.

CONSERVA CITRI AURANTII. *Ed.*
Conserve of Orange-peel.

Grate off the rind of Seville oranges, beat it into pulp, and while beating it, add gradually three times its weight of refined sugar.

CONFECTIO ROSÆ CANINÆ. *Lond.*
Confection of Hips.

Take of
- Pulp of hips, one pound;
- Refined sugar, in powder, twenty ounces.

Expose the pulp to a gentle heat in a water-bath, then gradually add the sugar, and beat them into a homogeneous mass.

CONSERVA ROSÆ CANINÆ. *Ed.*
Conserve of Hips.

Beat ripe hips, carefully cleansed from the seeds and down, to a pulp; and, while beating it, gradually add three times its weight of double refined sugar.

CONFECTIO ROSÆ GALLICÆ. *Lond.*
Confection of Red Roses.

Take of
- Red rose buds, with the heels cut off, one pound;
- Refined sugar, three pounds.

Beat the petals in a stone mortar; then add the sugar, and reduce the whole to a homogeneous mass.

CONSERVA ROSÆ. *Dub.*
Conserve of Red Roses.

Pluck the petals of red rose buds from the calyces; and having cut off the heels, beat them, gradually adding three times their weight of refined sugar.

CONSERVA ROSÆ GALLICÆ. *Ed.*
Conserve of Red Roses.

Beat the petals of red rose buds to pulp; and add, during the beating, three times their weight of double refined sugar.

LA GRANGE says, that by infusing the red rose leaves in four times their weight of water, and squeezing them out of the infusion, they lose their bitterness, and are more easily reduced to a pulp, which he then mixes with a thick syrup, prepared by dissolving the sugar in the expressed liquor, and boiling it down to the consistence of an electuary.

It is scarcely necessary to make any particular remarks on these conserves. Their taste and virtues are compounded of those of sugar, and the substance combined with it. The hips are acidulous and refrigerant, the orange rind bitter and stomachic, and the red rose buds astringent.

ELECTUARIUM AROMATICUM. *Ed.*
Aromatic Electuary.

Take of
Aromatic powder, one part;
Syrup of orange-peel, two parts.
Mix and beat them well together, so as to form an electuary.

Dub.

Take of
Cinnamon,
Nutmeg, of each half an ounce;
Refined sugar,
Saffron, of each one ounce;
Lesser cardamom seeds, husked,
Cloves, each two drachms;
Precipitated chalk, two ounces;
Syrup of orange-peel, a sufficient quantity.
Powder the aromatics separately, then mix them with the syrup.

CONFECTIO AROMATICA. *Lond.*
Aromatic Confection.

Take of
Cinnamon bark,
Nutmeg, of each two ounces;
Cloves, one ounce;
Cardamom seeds, half an ounce;
Saffron, dried, two ounces;
Prepared oyster shells, sixteen ounces;
Refined sugar, in powder, two pounds;
Water, one pint.
Reduce the dry substances together to a very fine powder, then gradually add the water, and mix them until they be incorporated.

THESE compositions are sufficiently grateful, and moderately warm. They are given in the form of bolus, in doses of from five grains to a scruple, or upwards, as a cordial astringent, or as a vehicle for more active substances. Mr Phillips also very properly remarks, that in the London formula, and indeed in every instance, prepared chalk might be advantageously substituted for oyster shells, as it is hardly possible to reduce the latter to so fine a powder as the former.

CONFECTIO PIPERIS NIGRAE. *Lond.*
Confection of Black Pepper.

Take of
Black pepper;
Elecampane root, of each one pound;
Fennel seeds, three pounds;
Honey,
Purified sugar, of each two pounds.

Triturate the dry substances together into a very fine powder; then add the honey, and beat the whole into an uniform mass.

WE are told by Dr Paris that this resembles Ward's Paste for fistula and piles, and that the dose is the size of a nutmeg, three times a-day. It is to be considered as a hot carminative.

ELECTUARIUM CASSIÆ FISTULÆ. *Ed.*
Electuary of Cassia.

Take of
Pulp of cassia fistularis, four parts;
Pulp of tamarinds,
Manna, each, one part;
Syrup of pale roses, four parts.

Having bruised the manna in a mortar, dissolve it with a gentle heat in the syrup; then add the pulps, and evaporate with a regularly continued heat to a proper consistence.

ELECTUARIUM CASSIÆ. *Dub.*
Electuary of Cassia.

Take of
The fresh extracted pulp of cassia, half a pound;
Manna, two ounces;
Pulp of tamarinds, one ounce;
Syrup of orange-peel, half a pound.

Dissolve the manna, bruised, with a moderate heat, in the syrup; then add the pulps; and evaporate slowly the mixture to a proper thickness.

CONFECTIO CASSIÆ. *Lond.*
Confection of Cassia.

Take of
Fresh cassia pulp, half a pound;
Manna, two ounces;
Tamarind pulp, one ounce;
Syrup of roses, half a pint.

Bruise the manna; then dissolve it in the syrup, by the heat of a water-bath; lastly, mix in the pulps, and evaporate to a proper thickness.

THE electuary is scarcely used, as it is expensive and has very little power. It could be serviceable only as a vehicle for more active medicines.

ELECTUARIUM SENNÆ COMPOSITUM. *Ed.*
Electuary of Senna.
CONFECTIO SENNAE. *Lond.*
Confection of Senna.

Take of	*Ed.*	*Lond.*
Senna leaves,	eight ounces;	eight ounces;
Coriander seeds,	four ounces;	four ounces;
Liquorice root bruised,	three ounces;	three ounces;
Figs,		one pound;
Pulp of prunes,	each one pound;	half a pound;
——— tamarinds,	half a pound;	half a pound;
——— cassia fistula,		half a pound;
Refined sugar,	two pounds and a half;	two pounds and a half;
Water,	four pounds;	four pints.

Powder the senna leaves with the coriander seeds, and sift out ten ounces of the mixed powder; boil the remainder with the figs and liquorice in four pints of water to one half; express and strain the liquor, which is then to be evaporated to a pint and a half; dissolve the sugar in this so as to make a syrup; add this syrup by degrees to the pulps; and, lastly, mix in the sifted powder.

ELECTUARIUM SENNÆ. *Dub.*
Electuary of Senna.

Take of
Senna leaves, in very fine powder, four ounces;
Pulp of French prunes, one pound;
——— tamarinds, two ounces;
Molasses, a pint and a half;
Essential oil of caraway, two drachms.

Boil the pulps in the syrup to the thickness of honey: then add the powder, and, when the mixture cools, the oil; lastly, mix the whole intimately.

MR PHILLIPS, speaking of the London formula, says that it "is generally very badly prepared, containing neither senna nor cassia, and sold for one-third the price the genuine preparation costs." The Edinburgh formula is less liable to falsification, as it has omitted the cassia and figs; but the formula of the Dublin College seems much more simple and judicious than the others. It is a very convenient laxative, and has long been in common use among practitioners. Taken to the size of a nutmeg, or more, as occasion may require, it is an excellent laxative for loosening the belly in costive habits.

Electuarium catechu compositum. *Ed.*
Compound Electuary of Catechu.

Take of
- Extract of catechu, four ounces;
- Kino, four ounces;
- Cinnamon bark,
- Nutmeg, each one ounce;
- Opium, diffused in a sufficient quantity of Sherry wine, one drachm and a half;
- Syrup of red roses, boiled to the consistence of honey, two pounds and a quarter.

Reduce the solids to powder; and having mixed them with the opium and syrup, make them into an electuary.

Electuarium catechu compositum. *Dub.*
Compound Electuary of Catechu.

Take of
- Catechu, four ounces;
- Cinnamon, two ounces;
- Kino, three ounces; powder these, then add,
- Hard purified opium, diffused in Spanish white wine, a drachm and a half;
- Syrup of ginger, evaporated to the consistence of honey, two pounds and a quarter.

Mix them.

These electuaries are extremely useful astringent medicines, and are often given in doses of a tea spoonful, frequently repeated, in cases of diarrhœa, &c. Ten scruples contain one grain of opium.

Confectio scammoneæ. *Lond.*
Confection of Scammony.

Take of
- Scammony, in powder, one ounce and half;
- Cloves, bruised,
- Ginger, in powder, of each six drachms;
- Oil of caraway, half a fluidrachm;

Syrup of roses, as much as is sufficient.

Reduce the dry substances together to a very fine powder; then add the syrup, and triturate them again together; lastly, add the oil of caraway, and mix the whole.

ELECTUARIUM SCAMMONII. *Dub.*
Electuary of Scammony.

Take of
Scammony,
Ginger, of each, in powder, one ounce;
Oil of cloves, one scruple;
Syrup of orange-peel, what is sufficient.

Mix the powdered ginger with the syrup; then add the scammony, and lastly the oil.

THIS electuary is a warm brisk purgative. A drachm contains ten grains of scammony.

ELECTUARIUM OPIATUM; olim ELECTUARIUM THEBAICUM. *Ed.*
Opiate Electuary, formerly called *Thebaic Electuary.*

Take of
Aromatic powder, six ounces;
Virginian snake-root, in fine powder, three ounces;
Opium, diffused in a sufficient quantity of Sherry wine, half an ounce;
Syrup of ginger, one pound.

Mix them, and form an electuary.

CONFECTIO OPII. *Lond.*
Confection of Opium.

Take of
Hard opium, powdered, six drachms;
Long pepper, one ounce;
Ginger, two ounces;
Caraway seeds, three ounces;
Syrup, one pint.

Mix the opium with the syrup heated; then add the other ingredients, powdered, and mix.

THE action which these electuaries will produce on the living system is abundantly apparent from the nature of their ingredients. They are combinations of aromatics with opium; one grain of opium being contained in thirty-six of the London confection, and in forty-three of the Edinburgh electuary.

CONFECTIO RUTÆ. *Lond.*
Confection of Rue.

Take of
- Rue leaves, dried,
- Caraway seeds,
- Laurel berries, of each an ounce and a half;
- Sagapenum, half an ounce;
- Black pepper, two drachms;
- Clarified honey, sixteen ounces.

Triturate the dry substances together to a very fine powder; then adding the honey, mix the whole.

THIS was long supposed to be a powerful antihysteric. Its use is now confined to glysters.

CHAP. XXXVIII.—TROCHES.

TROCHES and lozenges are composed of powders made up with glutinous substances into little cakes, and afterwards dried. This form is principally made use for the more commodious exhibition of certain medicines, by fitting them to dissolve slowly in the mouth, so as to pass by degrees into the stomach, or to act upon the pharynx and top of the trachea; and hence these preparations have generally a considerable proportion of sugar, or other materials grateful to the palate. Some powders have likewise been reduced into troches, with a view to their preservation. The lozenges of the confectioner are so superior in elegance to those of the apothecary, that they are almost universally preferred; and hence it probably is that the Dublin and London Colleges have entirely omitted them.

TROCHISCI CARBONATIS CALCIS. *Ed.*
Troches of Carbonate of Lime.

Take of
- Carbonate of lime, prepared, four ounces;
- Gum arabic, one ounce;
- Nutmeg, one drachm;
- Refined sugar, six ounces.

Powder them together, and form them with water into a mass for making troches.

These are used against acidity of the stomach, especially when accompanied with diarrhœa.

TROCHISCI CARBONATIS MAGNESIÆ. *Ed.*

Troches of Carbonate of Magnesia.

Take of
Carbonate of magnesia, six ounces;
Refined sugar, three ounces;
Nutmeg, one scruple.
Powder them, and make them into a mass for troches, with mucilage of tragacanth.

Troches of magnesia are much used for acidity of stomach.

TROCHISCI GLYCYRRHIZÆ GLABRÆ. *Ed.*

Troches of Liquorice.

Take of
Extract of liquorice,
Gum arabic, each one part;
Refined sugar, two parts.
Boiling water, a sufficient quantity.
Dissolve and strain; then evaporate the solution over a gentle fire, till it be of a proper consistence for being formed into troches.

These troches are apt to be empyreumatic, and even when well prepared are found by many to be too sweet, and hence, common extract of liquorice, which is less cloying to the stomach than sugar, is preferred by some; and refined liquorice, which is made of extract of liquorice, with half of its weight of gum arabic, may altogether supersede these troches.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. *Ed.*

Liquorice Troches with Opium.

Take of
Opium, two drachms;
Tincture of Tolu, half an ounce;
Common syrup, eight ounces;
Extract of liquorice, softened with warm water,
Gum arabic, in powder, of each five ounces.
Triturate the opium well with the tincture, then add by degrees the syrup and extract; afterwards gradually mix in the powdered gum arabic. Lastly, dry them so as to form a mass, to be divided into troches, each weighing ten grains.

This is a troublesome process. It is not easy to make an uniform mixture of the opium with the tincture; and the softening of the liquorice in an undetermined quantity of warm water, and its subsequent incorporation, are equally inconvenient. They are more easily prepared, and the uniform diffusion of the opium is more certainly attained, by previously drying and reducing to powder the opium and liquorice, which are to be intimately mixed with the powdered gum arabic. This is to be beat into a mass first with the tincture, and then the syrup, and if necessary a little water gradually added. Refined extract of liquorice may be used; and it is easily powdered in the cold, after it has been laid for some days in a dry and rather warm place; but its quantity must be increased to 7.5 ounces, and that of the gum arabic reduced to 2.5.

Seven and a half of these troches contain about one grain of opium. These troches are medicines of approved efficacy in tickling coughs depending on irritation of the fauces, diminishing the irritability of the parts themselves.

TROCHISCI GUMMOSI. *Ed.*
Gum Troches.

Take of
- Gum arabic, four parts;
- Starch, one part;
- Refined sugar, twelve parts.

Powder them, and make them into a proper mass with rose-water, so as to form troches.

This is a very agreeable pectoral, and may be used at pleasure. It is calculated for allaying the tickling in the throat which provokes coughing.

TROCHISCI NITRATIS POTASSÆ. *Ed.*
Troches of Nitrate of Potass.

Take of
- Nitrate of potass, one part;
- Double refined sugar, three parts.

Rub together to powder, and form them, with mucilage of gum tragacanth, into a mass, to be divided into troches.

This may be an agreeable form for the exhibition of nitre; but if the quantity taken be considerable, it is apt to occasion uneasiness in the stomach, which can only be prevented by large dilution with aqueous liquors.

Chap. XXXIX.—PILLS.

This form is peculiarly adapted to those drugs which operate in a small dose, and whose nauseous and offensive taste or smell require them to be concealed from the palate.

Pills should have the consistence of a firm paste, a round form, and a weight not exceeding five grains. Essential oils may enter them in small quantity, deliquescent salts are improper. Efflorescent salts, such as carbonate of soda, should be previously exposed to the air until they fall to powder: deliquescent extracts should have some powder combined with them. The mass should be beaten until it become perfectly uniform and plastic. Powders may be made into pills with extracts, balsams, soap, mucilages, bread crumb, &c.

Gum-resins, and inspissated juices, are sometimes soft enough to be made into pills, without addition: where any moisture is requisite, spirit of wine is more proper than syrups or conserves, as it unites more readily with them, and does not sensibly increase their bulk. Light dry powders require syrups or mucilages; and the more ponderous, as the mercurial and other metallic preparations, require thick honey, conserve, or extracts.

Light powders require about half their weight of syrup, or about three-fourths their weight of honey, to reduce them into a due consistence for forming pills. Half a drachm of the mass will make five or six pills of a moderate size.

Gums and inspissated juices are to be first softened with the liquid prescribed; the powders are then to be added, and the whole beat thoroughly together, till they be perfectly mixed.

The masses for pills are best kept in bladders, which should be moistened now and then with some of the same kind of liquid that the mass was made up with, or with some proper aromatic oil.

When the mass is to be divided into pills, a given weight of it is rolled out into a cylinder of a given length, and of an equal thickness throughout, and is then divided into a given number of equal pieces, by means of a simple machine. These pieces are then rounded between the fingers, or by a machine; and to prevent them from adhering, they are covered either with some powder, or gold or silver leaf. In this country we commonly use starch, or powder of liquorice, or orris root. In Germany the powder of lycopodium is much employed.

PILULÆ ALOETICÆ. *Ed.*
Aloetic Pills.

Take of
Aloes, in powder,
Soap, equal parts.
Beat them with simple syrup into a mass fit for making pills.

PILULÆ ALOES CUM ZINGIBERE. *Dub.*
Pills of Aloes and Ginger.

Take of
Hepatic aloes, one ounce;
Ginger root, in powder, one drachm;
Soap, half an ounce;
Essence of peppermint, half a drachm.
Powder the aloes with the ginger, then add the soap and the essence, so as to form an intimate mixture.

PILULÆ ALOES COMPOSITÆ. *Lond.*
Compound Pills of Aloes.

Take of
Socotorine aloes, powdered, one ounce;
Extract of gentian, half an ounce;
Oil of caraway, forty minims;
Simple syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

ALTHOUGH soap can scarcely be thought to facilitate the solution of the aloes in the stomach, as was supposed by Boerhaave, it is a very fit substance to give it the proper consistence for making pills.

The extract of gentian used by the London College is less proper; for triturated with aloes they re-act upon each other, and become too soft to form pills, so that the addition of any syrup to the mass is perfectly unnecessary; some powder is rather necessary to give it consistency.

Aloetic pills are much used as warm and stomachic laxatives; they are very well suited for the costiveness so often attendant on people of sedentary lives, and, upon the whole, are one of the most useful articles in the materia medica.

PILULÆ ALOES ET ASSAFŒTIDÆ. *Ed.*
Pills of Aloes and Assafœtida.

Take of
  Socotorine aloes, in powder,
  Assafœtida,
  Hard soap, equal parts.
Form them into a mass with mucilage of gum arabic.

THESE pills, in doses of about ten grains, twice a-day, produce the most salutary effects in cases of dyspepsia, attended with flatulence and costiveness.

PILULÆ ALOES ET MYRRHÆ. *Ed.*
Pills of Aloes and Myrrh.

Take of
  Socotorine aloes, four parts;
  Myrrh, two parts;
  Saffron, one part.
Beat them into a mass with simple syrup.

Dub.

Take of
  Hepatic aloes, one ounce;
  Myrrh, half an ounce;
  Saffron, in powder, two drachms;
  Essential oil of caraway, half a drachm;
  Syrup, a sufficient quantity.
Powder the aloes and myrrh separately, then mix the whole intimately together.

PILULÆ ALOES CUM MYRRHA. *Lond.*
Pills of Aloes with Myrrh.

Take of
  Socotorine aloes, two ounces;
  Myrrh,
  Saffron, of each one ounce;
  Simple syrup, as much as is sufficient.
Powder the aloes and myrrh separately; and afterwards beat all the ingredients together into a homogeneous mass.

THESE pills have long continued in practice, with little alteration. Given to the quantity of half a drachm, or two scruples, they prove considerably cathartic, but they answer better in smaller doses as laxatives or alteratives.

PILULÆ ASSÆFŒTIDÆ COMPOSITÆ. *Ed.*
Compound Pills of Assafœtida.

Take of
Assafœtida,
Galbanum,
Myrrh, of each eight parts;
Rectified oil of amber, one part.
Beat them into a mass with simple syrup.

PILULÆ MYRRHÆ COMPOSITÆ. *Dub.*
Compound Pills of Myrrh.

Take of
Assafœtida,
Galbanum,
Myrrh, each one ounce;
Rectified oil of amber, half a drachm.
Beat them into a mass with simple syrup.

PILULÆ GALBANI COMPOSITÆ. *Lond.*
Compound Pills of Galbanum.

Take of
Galbanum, one ounce;
Myrrh,
Sagapenum, of each one ounce and a half;
Assafœtida, half an ounce;
Simple syrup, as much as is sufficient.
Beat them together into a homogeneous mass.

THESE pills are designed for antihysterics and emmenagogues, but they are apt to fall down after being made; half a scruple, a scruple, or more, may be taken every night, or oftener. It is singular that each of the colleges should have given them different names. The assafœtida is certainly the most powerful article.

PILULÆ COLOCYNTHIDIS COMPOSITÆ. *Ed.*
Compound Pills of Colocynth.

Take of
Socotorine aloes,
Scammony, of each eight parts;
Colocynth pulp, four parts;
Oil of cloves,
Sulphate of potass, of each one part.
Reduce the aloes and scammony with the sulphate into a powder; then mix in the colocynth, beat into a very fine

powder, and the oil: lastly, make it into a proper mass with mucilage of gum arabic.

Dub.

Take of
  Pith of colocynth, half an ounce;
  Hepatic aloes,
  Scammony, each one ounce;
  Castile soap, two drachms;
  Oil of cloves, one drachm.

Powder the aloes, scammony, and colocynth, separately: then triturate them with the soap and the oil, and form them into a mass with simple syrup.

This is more powerful in its operation than the simpler aloetic pills.

Pilulæ gambogiæ compositæ. *Ed.*
Compound Pills of Gamboge.

Take of
  Gamboge, in powder,
  Socotorine aloes in powder,
  Compound powder of cinnamon, of each one drachm;
  Soap, two drachms.

Mix the powders, then add the soap, and beat the whole into a homogeneous mass.

Pilulæ cambogiæ compositæ. *Lond.*
Compound Gamboge Pills.

Take of
  Gamboge in powder, a drachm;
  Socotorine aloes in powder, a drachm and a half;
  Ginger, half a drachm;
  Soap, two drachms.

Mix the powders together, then add the soap, and beat the whole into a homogeneous mass.

This is a very useful purgative pill, being considerably more active than aloes alone.

Pilulæ ammoniareti cupri. *Ed.*
Pills of Ammoniaret of Copper.

Take of
  Ammoniaret of copper, in fine powder, sixteen grains;
  Bread crumb, four scruples;
  Water of carbonate of ammonia, as much as may be sufficient.

Beat them into a mass, to be divided into thirty-two equal pills.

Each of these pills weighs about three grains, and contains somewhat more than half a grain of the ammoniaret of copper. They seem to be the best form of exhibiting this medicine.

PILULÆ FERRI COMPOSITÆ. *Lond.*
Compound Pills of Iron.

Take of
Myrrh, in powder, two drachms;
Subcarbonate of soda,
Sulphate of iron,
Sugar, of each one drachm.

Powder the myrrh with the subcarbonate of soda; next having added the sulphate of iron, rub them again; then beat the whole, mixed together, into a homogeneous mass.

This is Griffith's mixture in a solid form, and may often be convenient.

PILULÆ SULPHATIS FERRI COMPOSITÆ. *Ed.*
Compound Pills of Sulphate of Iron.

Take of
Sulphate of iron, in powder, one ounce;
Extract of chamomile, one ounce and a half;
Volatile oil of peppermint, one drachm.

Beat into a mass, with simple syrup.

This differs from the London pill, which contains the iron in the state of an oxide: in the formula of Edinburgh, the sulphate is exhibited in its saline form. Both are good chalybeates.

PILULÆ HYDRARGYRI. *Ed.*
Mercurial Pills.

Take of
Purified quicksilver,
Conserve of red roses, of each one ounce;
Starch, two ounces;
Mucilage of gum arabic, a little.

Triturate the quicksilver with the conserve, in a glass mortar, till the globules completely disappear, adding, occasionally, a little mucilage of gum arabic; then add the starch, and beat the whole with a little water into a mass, which is to be immediately divided into four hundred and eighty equal pills.

Lond. Dub.

Take of
Purified quicksilver, two drachms;
Confection of red roses, three drachms;
Liquorice root, powdered, one drachm;
Rub the quicksilver with the confection until the globules disappear; then, adding the liquorice powder, mix them together into a homogeneous mass.

The common mercurial pill is one of the best preparations of mercury, and may, in general, supersede most other forms of this medicine. In this preparation the mercury is minutely divided, and probably converted into the black oxide. To effect its mechanical division, it must be triturated with some viscid substance. Soap, resin of guaiac, honey, extract of liquorice, and manna, have been, at different times, recommended; but all the colleges now concur in the use of conserve of roses. The mercury is most easily known to be completely extinguished, if no globules appear, on rubbing a very little of the mass with the point of the finger on a piece of paper. As soon as this is the case, it is necessary to mix with the mass a proportion of some dry powder, to give it a proper degree of consistency. For this purpose, powder of liquorice root has been commonly used; but it is apt to become mouldy, and to cause the pills to spoil. The Edinburgh College have, therefore, substituted for it starch, which is a very unalterable substance, and easily procured, at all times, in a state of purity. One grain of mercury is contained in four grains of the Edinburgh mass, and in three of the London and Dublin; but, in point of fact, the blue pill is now manufactured by machinery, and therefore uniform over the whole empire. The dose of these pills must be regulated by circumstances.

PILULÆ HYDRARGYRI SUBMURIATIS COMPOSITÆ. *Ed.*
Compound Pills of Submuriate of Mercury.

Take of
Submuriate of quicksilver,
Precipitated sulphuret of antimony, of each one drachm;
Guaiac, in powder, two drachms.
Triturate the submuriate with the precipitated sulphuret of antimony, and then with the guaiac; and add as much

mucilage of gum arabic as will give the mass a proper consistence.

Lond.

Take of
Submuriate of mercury,
Precipitated sulphuret of antimony, of each two drachms.
Guaiac, gum resin, in powder, half an ounce;
Rectified spirit, half a drachm.
Rub the submuriate of mercury with the precipitated sulphuret of antimony, and then with the guaiac, and add the spirit to give it a proper consistence.

These pills were recommended to the attention of the public, about forty years ago, by Dr Plummer, whose name they long bore. He represented them as a very useful alterative, and on his authority they were at one time much employed.

PILULÆ OPIATÆ; olim PILULÆ THEBAICÆ. *Ed.*
Opiate, formerly *Thebaic Pills.*

Take of
Opium, one part;
Extract of liquorice, (soap?) seven parts;
Jamaica pepper, two parts.
Beat the opium and soap into a pulp, mix them: then add the pepper reduced to powder; and form the whole into a mass.

PILULÆ SAPONIS CUM OPIO. *Lond.*
Pills of Soap with Opium.

Take of
Hard opium, in powder, half an ounce;
Hard soap, two ounces.
Beat them into a homogeneous mass.

PILULÆ E STYRACE. *Dub.*
Storax Pills.

Take of
Purified storax, three drachms;
Soft purified opium,
Saffron, of each one drachm.
Beat them into an uniform mass.

It is unfortunate that these compositions should differ so much in strength, the first containing one grain of opium in three, the second one in five, and the last only one in ten of the mass. Under the idea that opium is to operate as a sedative, the addition of the pepper is somewhat injudicious. The title adopted by the Edinburgh College is ambiguous, as it may be mistaken for pills of opium, without any addition. That of the Dublin College is better, although it does not mention the only active ingredient, as it is often necessary to conceal from our patients that we are giving them opium, which both the name and the smell of the storax enable us to do. But that of the London College is upon the whole perhaps the best.

PILULÆ RHEI COMPOSITÆ. *Ed.*
Compound Pills of Rhubarb.

Take of
  Rhubarb, in powder, one ounce;
  Socotorine aloes, six drachms;
  Myrrh, half an ounce;
  Volatile oil of peppermint, half a drachm.
Make them into a mass, with syrup of orange peel.

THIS pill is intended for moderately warming and strengthening the stomach, and gently opening the belly. A scruple of the mass may be taken twice a-day.

PILULÆ SUBCARBONATIS SODÆ. *Ed.*
Pills of Subcarbonate of Soda.

Take of
  Dried subcarbonate of soda, four parts;
  Hard soap, three parts.
Beat into a mass with simple syrup.

THIS is one of the most convenient forms of giving soda: It was introduced into use by Dr Beddoes. But the pills were very seldom well prepared. The salt should be previously quite deaquesced, and no water should be added, but the mass beat as stiff as possible.

PILULÆ SCILLÆ COMPOSITÆ. *Lond.*
Compound Pills of Squill.

Take of
  Fresh dried squills, powdered, one drachm;
  Ginger powdered,
  Hard soap, of each three drachms;
  Gum ammoniac, in powder, two drachms.
Mix the powders together, then beat them with the soap,

with the addition of as much syrup as will give them a proper consistence.

PILULÆ SCILLÆ CUM ZINGIBERE. *Dub.*
Squill Pills with Ginger.

Take of
Powder of squills, one drachm;
Ginger, in powder, two drachms;
Essential oil of aniseed, ten drops.
Triturate together, and form into a mass with jelly of soap.

PILULÆ SCILLITICÆ. *Ed.*
Squill Pills.

Take of
Dried root of squills, in fine powder, one scruple;
Gum ammoniac,
Lesser cardamom seeds, in powder,
Extract of liquorice, each one drachm.
Form them into a mass with simple syrup.

THIS is a commodious form for the exhibition of squills, whether for promoting expectoration, or with the other intentions to which that medicine is employed. As the virtue of the compound is derived chiefly from the squills, the other ingredients are often varied in extemporaneous prescription.

CHAP. XL.—CATAPLASMS.

CATAPLASMA FERMENTI. *Lond.*
Yeast Cataplasm.

Take of
Flour, one pound;
Bear yeast, half a pint.
Mix and expose to a gentle heat, till the mass begin to swell.

THE yeast excites fermentation in the flour, and converts the whole into a thin dough. This cataplasm is considered as a very efficacious application to putrid or putrescent ulcers or tumours.

CATAPLASMA SINAPEOS. *Dub.*
Mustard Cataplasm.

Take of
Mustard seed, powdered,
Crumb of bread, of each half a pound;
Vinegar, as much as is sufficient.
Mix, and make a cataplasm.

Sinapisms may be made stronger, by adding of Horse-radish root, scraped, two ounces.

CATAPLASMA SINAPIS. *Lond.*
Mustard Cataplasm.

Take of
Mustard seed,
Linseed, of each, in powder, half a pound;
Warm vinegar, as much as may be sufficient.
Mix to the thickness of a cataplasm.

CATAPLASMS of this kind are commonly known by the name of *Sinapisms.* They were formerly more complicated, containing garlic, black soap, and other similar articles. They are employed only as stimulants; they often inflame and vesicate the part, but they are commonly removed in ten or fifteen minutes before they raise full blisters, and indeed the pain they excite cannot be longer borne. They are frequently applied to the soles of the feet, in the low state of acute diseases, for raising the pulse, and relieving the head. The chief advantage they have depends on the quickness of their action.

CHAP. XLI.—LINIMENTS, OINTMENTS, CERATES AND PLASTERS.

THESE are all combinations of fixed oil, or animal fat, with other substances, and differ from each other only in consistence. Deyeux has, indeed, lately defined plasters to be combinations of oil with metallic oxides; but as this would comprehend many of our present ointments, and exclude many of our plasters, we shall adhere to the old meaning of the terms.

Liniments are the thinnest of these compositions, being only a little thicker than oil.

Ointments have generally a degree of consistence like that of butter.

Cerates are firmer, and contain a larger proportion of wax.

Plasters are the most solid, and derive their firmness, either from a large proportion of wax, rosin, &c. or from the presence of some metallic oxide, such as that of lead.

Plasters should have such a consistence as not to adhere to the fingers when cold, but become soft and plastic when gently heated. The heat of the body should render them tenacious enough to adhere to the skin, and to the substance on which they are spread. When prepared they are usually formed into rolls, and inclosed in paper. Plasters of a small size are often spread on leather, sometimes on strong paper, or on tinfoil, by means of a spatula gently heated, or the thumb. The leather is cut of the shape wanted, but somewhat larger; and the margin all around, about ¼ inch in breadth, is left uncovered, for its more easy removal when necessary. Linen is also used, especially for the less active plasters, which are used as dressings, and often renewed. It is generally cut into long slips, of various breadths, from one to six inches. These may either be dipt into the melted plaster, and passed through two pieces of straight smooth wood, held firmly together, so as to remove any excess of plaster; or, what is more elegant, they are spread on one side only, by stretching the linen, and applying the plaster, which has been melted and allowed to become almost cold, evenly, by means of a spatula gently heated, or, more accurately, by passing the linen on which the plaster has been laid, through a machine formed of a spatula fixed by screws, at a proper distance from a plate of polished steel.

The Dublin College prefixes the following general direction;

Tutty and calamine employed in making ointments are prepared in the same manner as chalk.

In making ointments and plasters, the wax, resins, and fats, are to be melted with a moderate heat, then removed from the fire, and constantly stirred, until they cool, adding, at the same time, the dry ingredients, if there be any, in very fine powder.

SEVUM PRÆPARATUM. *Lond.*
Prepared Suet.

Cut the suet into pieces, melt it over a slow fire, and express it through linen.

ADEPS PRÆPARATA. *Lond.*
Prepared Hogs Lard.

Cut the lard into pieces, melt it over a slow fire, and express it through linen.

ADEPS SUILLUS PRÆPARATUS. *Dub.*
Prepared Hogs Lard.

Melt fresh lard, cut in pieces, with a moderate heat, and strain with expression through flannel.

Lard, which is purified by those who sell it, and which is preserved with salt, is to be melted with twice its weight of boiling water, and the mixture well agitated. Set it then aside until it cool, and separate the fat.

BEFORE proceeding to melt these fats, it is better to separate as much of the membranes as possible, and to wash them in repeated quantities of water until they no longer give out any colour. Over the fire they will be perfectly transparent, and, if they do not crackle on throwing a few drops into the fire, it is a sign that all the water is evaporated, and that the fats are ready for straining, which should be done through a linen cloth without expression. The residuum may be repeatedly melted with a little water, until it become discoloured with the fire. The fluid fat should be poured into the vessels, or bladders, in which it is to be preserved.

These articles had formerly a place also among the preparations of the Edinburgh College. But now they introduce them only into their list of the materia medica; as the apothecary will, in general, find it more for his interest to purchase them thus prepared, than to prepare them for himself; for the process requires to be very cautiously conducted, to prevent the fat from burning or turning black.

CERA FLAVA PURIFICATA. *Dub.*
Purified Yellow Wax.

Take of

Yellow wax, any quantity.

Melt it with a moderate heat, remove the scum, and after allowing it to settle, pour it cautiously off from the fæces.

YELLOW wax is so often adulterated, that this process is by no means unnecessary.

LINIMENTUM SIMPLEX. *Ed.*
Simple Liniment.

Take of
Olive oil, four parts;
White wax, one part.

Melt the wax in the oil with a gentle heat, then stir the mixture well until it become stiff on cooling.

UNGUENTUM SIMPLEX. *Ed.*
Simple Ointment.

Take of
Olive oil, five parts;
White wax, two parts;

Melt the wax in the oil with a gentle heat, then stir the mixture well until it become stiff on cooling.

THESE two preparations differ only in the proportion of their ingredients and consequent consistence; both may be used for softening the skin and healing chaps.

UNGUENTUM CETACEI. *Lond.*
Ointment of Spermaceti.

Take of
Spermaceti, six drachms;
White wax, two drachms;
Olive oil, three fluidounces.

Melt them together over a slow fire, and stir them constantly until they be cold.

UNGUENTUM SPERMATIS CETI. *Dub.*
Ointment of Spermaceti.

Take of
White wax, half a pound;
Spermaceti, one pound;
Prepared hogs lard, three pounds.

Make into an ointment.

THIS had formerly the name of *Linimentum album*: it is also a very mild application.

CERATUM SIMPLEX. *Ed.*
Simple Cerate.

Take of
Olive oil, six parts;
White wax, three parts;
Spermaceti, one part.

Melt the wax and spermaceti with the oil in a gentle heat, then stir the mixture well, until it become stiff on cooling.

CERATUM CETACEI. *Lond.*

Cerate of Spermaceti.

Take of

Spermaceti, half an ounce;
White wax, two ounces;
Olive oil, four fluidounces.

Add the oil to the wax and spermaceti, melted together, and stir until the cerate be cold.

THIS had formerly the name of *Ceratum album*, and it differs from the spermaceti ointment, only in being more consistent.

CERATUM SIMPLEX. *Lond.*

Simple Cerate.

Take of

Olive oil, four fluidounces;
Yellow wax, four ounces.

Add the oil to the melted wax, and mix.

UNGUENTUM CERÆ FLAVÆ. *Dub.*

Ointment of Yellow Wax.

Take of

Purified yellow wax, a pound;
Prepared hogs lard, four pounds.

Make into an ointment.

UNGUENTUM CERÆ ALBÆ. *Dub.*

Ointment of White Wax,

Is prepared in the same manner, with white wax, instead of yellow.

THIS is the common cerate, of which so much use is made in dressings.

UNGUENTUM SAMBUCI. *Lond.*

Elder Ointment.

Take of

Elder flowers,
Prepared lard, of each two pounds.

Boil the flowers in the lard till they become crisp; then express through linen.

Dub.

Take of
  Fresh elder flowers, three pounds ;
  Prepared hogs lard, four pounds ;
  Mutton suet, two pounds.

Boil the flowers in the lard until they become crisp ; then strain with expression ; lastly, add the suet, and melt them together.

This is merely a scented pomatum.

Compositions of this kind were formerly very frequent ; but for a long time have been rejected from the pharmacy of this country, under the idea, that vegetables, by boiling in fats and oils, impart to them nothing but a little mucilage, which changes the greasy oils to drying oils, and any resin or volatile oil they may contain ; but since the discovery that the virtues of narcotic vegetables reside in an alkaloid soluble in oil, the boiled oils of various vegetable matters deserve to be reconsidered.

Linimentum terebinthinæ. *Lond.*
Turpentine Liniment.

Take of
  Resinous cerate, one pound ;
  Oil of turpentine, half a pint.

Add the oil of turpentine to the cerate melted, and mix.

Much used for rubbing parts affected with rheumatic pains, and on sprained joints. Lint dipped in this liniment, melted, is applied as hot as it can be borne, as dressing to sphacelating and other sores which require to be stimulated.

Ceratum resinæ. *Lond.*
Resinous Cerate.

Take of
  Yellow resin,
  Yellow wax, of each one pound ;
  Olive oil, one pint.

Melt the resin and wax together with a slow fire ; then add the oil, and strain the cerate, while still hot, through linen.

Unguentum resinae albae. *Dub.*
Ointment of White Resin.

Take of
  Hogs lard, four pounds ;
  White resin, two pounds ;
  Yellow wax, one pound.

Make into an ointment, which is to be strained while hot, through a sieve.

UNGUENTUM RESINOSUM. *Ed.*
Resinous Ointment.

Take of
Hogs lard, eight parts;
Pine resin, five parts;
Yellow wax, two parts.
Melt the whole together, and stir the mixture well, until it become stiff on cooling.

THESE, which are varieties of the basilicon ointment, are commonly employed in dressings for digesting, cleansing, and incarnating wounds and ulcers.

EMPLASTRUM CERÆ. *Lond.*
Wax Plaster.

Take of
Yellow wax,
Prepared suet, of each three pounds;
Yellow resin, one pound.
Melt them together, and strain.

EMPLASTRUM SIMPLEX. *Ed.*
Simple Plaster.

Take of
Yellow wax, three parts;
Mutton suet,
Pine resin, each two parts.
Melt the whole with a gentle heat, and stir the mixture well, until it stiffen on cooling.

THIS is chiefly used to support the discharge from a part which has been blistered, and was therefore formerly called *Emplastrum attrahens.* Sometimes, however, it irritates too much, on account of the resin; and hence, when designed only for dressing blisters, the resin ought to be entirely omitted, unless where a continuance of the pain and irritation, excited by the vesicatory, is required. Indeed, plasters of any kind are not very proper for dressing blisters; their consistence makes them sit uneasy, and their adhesiveness renders the taking of them off painful. Cerates, which are softer and less adhesive, appear much more eligible.

UNGUENTUM ELEMI. *Dub.*
Ointment of Elemi.

Take of
Resin of elemi, one pound;
White wax, half a pound;
Prepared hogs lard, four pounds.
Make into an ointment, to be strained through a sieve while hot.

UNGUENTUM ELEMI COMPOSITUM. *Lond.*
Compound Ointment of Elemi.

Take of
Elemi, one pound;
Common turpentine, ten ounces;
Suet, prepared, two pounds;
Olive oil, two fluidounces.
Melt the elemi with the suet; and having removed it from the fire, mix with it immediately the turpentine and oil; after which strain the mixture through linen.

THIS ointment, formerly known by the name of *Linimentem Arcæi*, had great reputation for digesting, cleansing, and incarnating ulcers; and, as Mr Wilson states in his excellent Pharmacopœia Chirurgica, may be usefully employed for promoting a discharge from issues and setons.

UNGUENTUM PICIS LIQUIDÆ. *Lond.*
Tar Ointment.

Take of
Tar,
Prepared suet, of each one pound.
Melt them together, and express through linen.

Dub.

Take of
Tar,
Mutton suet prepared, of each half a pound.
Melt them together, and strain through a sieve.

Ed.

Take of
Tar, five parts;
Yellow wax, two parts.
Melt the wax with a gentle heat, then add the pitch, and strain the mixture constantly until it stiffen on cooling.

These are stimulating compositions, whose virtues depend upon the tar, which contains empyreumatic resin, and pyrolignic acid. They are chiefly used in some forms of porrigo.

Unguentum picis nigri. *Lond.*
Ointment of Pitch.

Take of
- Pitch,
- Yellow wax,
- Yellow resin, of each nine ounces;
- Olive oil, a pint.

Melt together, and express through linen.

This is a very stimulant ointment, from the empyreumatic resin.

Emplastrum picis compositum. *Lond.*
Compound Pitch Plaster.

Take of
- Burgundy pitch, two pounds;
- Frankincense, one pound;
- Yellow resin,
- Yellow wax, of each four ounces;
- Expressed oil of mace, one ounce;
- Olive oil,
- Water, of each two fluidounces.

To the pitch, resin, and wax melted together, add first the frankincense, and then the oil of mace, olive oil and water. Mix the whole, and boil down to a proper consistence.

This is the simple burgundy pitch plaster, a very common and useful domestic application, when a continued local stimulus is wanted, without much risk of exciting blisters or pustules. Some irritable habits are however unable to support it. This plaster is a very useful application in the catarrhal complaints of infants, and even of adults; and in slight affections of the liver, and rheumatic pains of the trunk of the body. It is generally worn for several days, or until it drops off, in consequence of the perspiration confined beneath it.

EMPLASTRUM CUMINI. *Lond.*
Cumin Plaster.

Take of
Cumin seeds,
Caraway seeds,
Bay berries, of each three ounces;
Burgundy pitch, three pounds;
Yellow wax, three ounces;
Olive oil,
Water, of each a fluidounce and a half.

Melt the pitch and wax together, and mix with them the dry ingredients, powdered, likewise the olive oil and the water, and boil down to a proper consistence.

THIS plaster has been recommended as a moderately warm discutient, and is directed by some to be applied to the hypogastric region, for strengthening the viscera, and expelling flatulencies.

EMPLASTRUM AROMATICUM. *Dub.*
Aromatic Plaster.

Take of
Frankincense, three ounces;
Yellow wax, half an ounce;
Cinnamon, in powder, six drachms;
Essential oil of pimento,
——————— lemon, each two drachms.

Melt the frankincense and wax together, and strain; when getting stiff, from being allowed to cool, mix in the cinnamon and oils, and make a plaster.

THIS has been considered as a very elegant stomach plaster. As this kind of compositions, on account of their volatile ingredients, does not keep, it is only made occasionally, and it should be but moderately adhesive, that it may not irritate the skin, and may without difficulty be frequently renewed; which such applications, in order to their producing any considerable effect, require to be.

UNGUENTUM SULPHURIS. *Lond.*
Sulphur Ointment.

Take of
Sublimed sulphur, three ounces;
Prepared lard, half a pound.
Mix.

Ed.

Take of
Hogs lard, four parts;
Sublimed sulphur, one part.
Mix them thoroughly.

Dub.

Take of
Prepared lard, four pounds;
Sublimed sulphur, one pound.
Make an ointment.

UNGUENTUM SULPHURIS COMPOSITUM. *Lond.*

Compound Sulphur Ointment.

Take of
Sublimed sulphur, half a pound;
White hellebore root, in powder, two ounces;
Nitrate of potass, one drachm;
Soft soap, half a pound;
Prepared lard, a pound and a half.
Mix.

SULPHUR is a certain remedy for scabies, and more safe than mercury. A pound of ointment serves for four unctions. The patient is to be rubbed every night; a fourth part of the body at each time. Though the disease may be thus cured by a single application, it is in general advisable to touch the parts most affected for a few nights longer, and to conjoin with the frictions, the internal use of sulphur.

UNGUENTUM ACIDI NITROSI. *Ed.*

Ointment of Nitrous Acid.

Take of
Hogs lard, one pound;
Nitrous acid, six drachms.
Mix the acid gradually with the melted axunge, and diligently beat the mixture as it cools.

Dub.

Take of
Olive oil, one pound;
Prepared hogs lard, four ounces;
Nitrous acid, one ounce, by weight.
Having melted the oil and lard together in a glass vessel, add the acid; digest with a moderate heat, in a water-

bath, for a quarter of an hour; then remove them from the bath, and stir them constantly with a glass rod, until they get stiff.

THE oil and axunge in this ointment are oxidized; for during the action of the acid upon them, there is a great deal of nitric oxide gas disengaged. It acquires a yellowish colour, and a firm consistency, and forms an efficacious and cheap substitute, in slight cutaneous affections, for the ointment of nitrate of mercury.

UNGUENTUM INFUSI CANTHARIDIS VESICATORIÆ. *Ed.*
Ointment of Infusion of Cantharides.

Take of
  Cantharides,
  White resin,
  Yellow wax, each one part;
  Hogs lard,
  Venice turpentine, each two parts;
  Boiling water, four parts.

Macerate the cantharides in the water for a night; then strongly press out and strain the liquor, and boil it with the lard till the water be consumed; then add the resin and wax; and, when these are melted, take the ointment off the fire, and add the turpentine.

UNGUENTUM CANTHARIDIS. *Lond.*
Ointment of Spanish Flies.

Take of
  Spanish flies, in very fine powder, two ounces;
  Distilled water, eight fluidounces.
  Cerate of resin, eight ounces.

Boil the water with the flies to one half, and filter; mix the cerate with the filtered liquor, and then evaporate to a proper consistence.

THERE is considerable difficulty, I understand, in preparing this ointment; for, when the water of the infusion of cantharides is boiled away, the matter which was dissolved by it has no tendency to unite with the ointment, but separates from it, and falls to the bottom. Constant stirring is therefore necessary, until the ointment become so thick, that no separation can take place. When properly made, it is a good issue ointment, sufficiently stimulating, but not so irritating as when the cantharides in powder are mixed with the ointment. A very good stimulating liniment may be composed by melting one part of this with half a part of camphor in powder, and three parts of turpentine.

UNGUENTUM PULVERIS CANTHARIDIS VESICATORIÆ. *Ed.*
Ointment of the Powder of Cantharides.

Take of
Resinous ointment, seven parts;
Cantharides, in very fine powder, one part.
Sprinkle the powder into the melted ointment, and stir the mixture constantly, until it become stiff, on cooling.

UNGUENTUM CANTHARIDIS. *Dub.*
Ointment of Spanish Flies.

Take of
Ointment of yellow wax, half a pound;
Spanish flies, in powder, an ounce.
Make into an ointment.

CERATUM CANTHARIDIS. *Lond.*
Cerate of Cantharides.

Take of
Spanish flies, in very fine powder, one drachm;
Cerate of spermaceti, six drachms.
Add the flies to the cerate, softened over the fire, and mix.

THIS ointment is employed in the dressing for blisters intended to be converted into issues, or to be kept running for a considerable time, which in many chronic, and some acute cases, is of great service. Particular care should be taken that the cantharides be reduced into a very subtile powder, and that the mixture be made as equal and uniform as possible.

EMPLASTRUM CANTHARIDIS. *Lond.*
Plaster of Spanish Flies.

Take of
Spanish flies, in very fine powder, one pound;
Wax plaster, one pound and a half;
Prepared hogs lard, one pound.
Having melted the plaster and lard together, and removed them from the fire, sprinkle in the flies, a little before they become firm, and mix the whole together.

EMPLASTRUM CANTHARIDIS. *Dub.*
Plaster of Spanish Flies.

Take of
Purified yellow wax,
Mutton suet, each one pound;
Yellow resin, four ounces;
Cantharides, in fine powder, one pound.

To the wax, suet, and resin, melted together, a little before they stiffen, on being allowed to cool, mix in the cantharides, and form an ointment.

EMPLASTRUM CANTHARIDIS VESICATORIÆ. *Ed.*
Plaster of Cantharides.

Take of
Mutton suet,
Yellow wax,
White resin,
Cantharides, in very fine powder, each equal weights.

Mix the powder with the other ingredients, previously melted together, and removed from the fire. Stir the mixture constantly, until it get stiff on cooling.

In making these blistering plasters, from an incautious application of heat, the cantharides sometimes lose their vesicating powers; therefore it is customary, after the blister is spread, to cover its surface with powdered cantharides. The desired effect is also more speedy and certain, if the part to which it is to be applied be well bathed with hot vinegar; and the blister is more easily removed if a bit of thin gauze be interposed between it and the skin.

It is needless here to enter into all the circumstances in which blisters are useful. After bloodletting they are the most powerful means of combating internal inflammation, whether acute or chronic; and they are powerful stimuli in diseases of torpor or exhaustion. The greatest inconvenience attending the use of cantharides is its tendency to excite strangury, which is best counteracted by the copious use of diluents.

EMPLASTRUM CALEFACIENS. *Dub.*
Calefacient Plaster.

Take of
Plaster of cantharides, one part;
Burgundy pitch, seven parts.

Melt together, with a moderate heat, and make into a plaster.

This is a very convenient plaster, being more active as a stimulant and rubefacient than the simple Burgundy pitch plaster, while it will scarcely ever raise a blister.

EMPLASTRUM CANTHARIDIS VESICATORIÆ COMPOSITUM. *Ed.*
Compound Plaster of Cantharides.

Take of
Venice turpentine, eighteen parts;
Burgundy pitch,
Cantharides, each twelve parts;
Yellow wax, four parts;
Subacetate of copper, two parts;
Mustard seed,
Black pepper, each one part.

Having first melted the pitch and wax, add the turpentine, and to these, still hot, add the other ingredients, reduced to a fine powder, and mixed, and stir the whole carefully together, until it become stiff on cooling.

THIS is supposed to be a most infallible blistering plaster. It certainly contains a sufficient variety of stimulating ingredients.

UNGUENTUM PIPERIS NIGRI. *Dub.*
Ointment of Black Pepper.

Take of
Prepared lard, one pound;
Black pepper, in powder, four ounces.

Make into an ointment.

THIS is stimulating and irritating.

UNGUENTUM VERATRI. *Lond.*
Ointment of White Hellebore.

Take of
White hellebore root, in powder, two ounces;
Prepared hogs lard, eight ounces;
Oil of lemon, twenty minims.

Mix.

UNGUENTUM HELLEBORI ALBI. *Dub.*
Ointment of White Hellebore.

Take of
Prepared hogs lard, one pound;
White hellebore root, in powder, three ounces.

Make into an ointment.

THIS is recommended in scabies, and other itchy cutaneous affections. Its virtues depend upon the narcotic alkali veratria.

UNGUENTUM SABINÆ. *Dub.*
Savine Ointment.

Take of
Fresh savine leaves, separated from the stalks and bruised, half a pound;
Prepared hogs lard, two pounds;
Yellow wax, half a pound.

Boil the leaves in the lard until they become crisp; then filter with expression; lastly, add the wax, and melt them together.

CERATUM JUNIPERI SABINAE. *Ed.* CERATUM SABINÆ. *Lond.*
Cerate of Savine.

Take of
Fresh savine leaves, bruised, one pound, (two parts, *Ed.)*
Yellow wax, half a pound, (one part, *Ed.)*
Prepared hogs lard, two pounds, (four parts, *Ed.)*

Boil the savine leaves with the lard and wax melted together, and express through linen.

WHEN properly prepared, this is another example of the impregnation of an ointment with the virtues of vegetable substances. The fresh leaves are to be boiled in the melted cerate until they become crisp and friable, which is a proof that all their water is exhaled, and their resin is dissolved. The ointment has now acquired a fine green colour, and is uniform and transparent without any tendency to separate.

In this state it is an excellent issue ointment, preferable to those of cartharides, especially in being less irritating, and having no tendency to excite strangury.

When no fresh leaves are to be had, or from indolence, the powder stirred into melted certate is sometimes substituted for the boiled ointment, but it is intolerably acrid, and almost caustic; and the practice should be discontinued. This improper ointment is easily known by being opaque and gritty, not smooth.

EMPLASTRUM OXIDI PLUMBI SEMIVITREI. *Ed.*
Plaster of the Semivitrified Oxide of Lead.

Take of
Semi-vitrified oxide of lead, in powder, one part;
Olive oil, two parts;
Water, what is required.

Boil them, constantly stirring the mixture till the oil and oxide unite.

EMPLASTRUM LITHARGYRI. *Dub.*
Litharge Plaster.

Take of
Litharge, in very fine powder, five pounds;
Olive oil, nine pounds;
Boiling water, two pints.

Mix them at a high temperature, (200° to 212°,) constantly stirring until the oil and litharge unite, so as to form a plaster, occasionally supplying the waste of the water with fresh additions.

EMPLASTRUM PLUMBI. *Lond.*
Lead Plaster.

Take of
Semi-vitrified oxide of lead in very fine powder, five pounds;
Olive oil, one gallon;
Water, two pints.

Boil together with a slow fire, constantly stirring them until the oil and oxide of lead acquire by their union the thickness of a plaster. But it will be necessary to add a little more boiling water, if that employed at first be almost all consumed before the end of the operation.

OXIDES of lead, boiled with oils, unite with them into a plaster of an excellent consistence, and forming a proper basis for several other plasters.

In the boiling of these compositions, a quantity of water must be added, to prevent the plaster from burning and growing black. Such water as it may be necessary to add during the boiling must be previously made hot; for cold liquor would not only prolong the process, but likewise occasion the matter to explode, and be thrown about with violence, to the great danger of the operator: this accident will equally happen upon the addition of hot water, if the plaster be extremely hot. It is therefore better to remove it from the fire a little before each addition of water.

These plasters, which have been long known under the name of *Diachylon*, are common applications in excoriations of the skin, slight flesh wounds, and the like. They keep the part soft and somewhat warm, and defend it from the air.

EMPLASTRUM RESINOSUM. *Ed.*
Resinous Plaster.

Take of
Plaster of semi-vitrified oxide of lead, five parts;
White resin, one part.
Melt with a gentle fire, and stir constantly until they stiffen on cooling.

EMPLASTRUM LITHARGYRI CUM RESINA. *Dub.*
Litharge Plaster with Resin.

Take of
Litharge plaster, three pounds and a half;
Yellow resin, half a pound.
To the litharge plaster melted with a moderate heat, add the resin, reduced to a very fine powder, that it may melt quickly, and make a plaster.

EMPLASTRUM RESINÆ. *Lond.*
Plaster of Resin.

Take of
Yellow resin, half a pound;
Lead plaster, three pounds.
Add the resin, in powder, to the lead plaster, melted with a slow fire, and mix.

THE adhesive plaster is used for keeping on other dressings; for retaining the edges of recent wounds together when we are endeavouring to cure them by the first intention, and especially for giving mechanical support to new flesh; and contracting the size of ulcers, in the manner recommended by Mr Baynton, for the cure of ulcers of the legs, a mode of treatment so efficacious, that it has entirely changed the character of these sores.

EMPLASTRUM ASSÆ FŒTIDÆ. *Ed.*
Plaster of Assafœtida.

Take of
Plaster of semi-vitrified oxide of lead,
Assafœtida, each two parts;
Galbanum,
Yellow wax, each one part.
Melt the plaster and wax, and add to the mixture the gum-resins previously melted and strained, and mix the whole thoroughly.

THIS plaster is applied to the umbilical region, or over the whole abdomen in hysteric cases; and sometimes with good effect.

EMPLASTRUM GUMMOSUM. *Ed.*
Gum Plaster.

Take of
Plaster of semi-vitrified oxide of lead, eight parts;
Gum ammoniacum,
Galbanum,
Yellow wax, each one part.

Melt the plaster and wax, and add to the mixture the gum resins previously melted and strained, and mix the whole thoroughly.

EMPLASTRUM GALBANI. *Dub.*
Plaster of Galbanum.

Take of
Plaster of litharge, two pounds;
Galbanum, half a pound;
Yellow wax, sliced, four ounces.

Add the plaster and wax to the galbanum melted, and then melt the whole together with a moderate heat.

EMPLASTRUM GALBANI COMPOSITUM. *Lond.*
Compound Plaster of Galbanum.

Take of
Strained galbanum, eight ounces;
Plaster of lead, three pounds;
Turpentine, ten drachms;
Frankincense, in powder, three ounces.

With the galbanum and turpentine melted together, mix first the frankincense, and afterwards the litharge plaster, melted with a very slow fire, and make a plaster.

ALL these plasters are used as digestives and suppuratives; particularly in abscesses, after a part of the matter has been maturated and discharged, for supporting or discussing the induration which remains. Mr Wilson also recommends it from his own observation, "applied over the whole lumbar region of children, in rickety affections, accompanied with great weakness in the lower extremities, and as a covering in enlarged joints." It is also useful in anomalous or arthritic pains of the ligaments, renewing it every eight or ten days.

EMPLASTRUM AMMONIACI. *Lond. Ed.*
Plaster of Ammoniac.

Take of
Strained gum ammoniac, five ounces, (five parts, *Ed.*)

Acetic acid, half a pint, (eight parts, *Ed.)*

Dissolve the ammoniac in the vinegar, then evaporate the solution in an iron pot, by the heat of a water-bath, stirring it constantly till it acquire a proper thickness.

THIS plaster differs in composition from all the others, as it is a mere solution, or softening of a gum resin, with acetic acid. The best mode of preparing it is to add to the gum ammoniac, in a Wedgwood mortar, the acid, gradually incorporating each portion thoroughly before more be added, and then evaporating the solution in an earthen evaporating vessel, placed in a water-bath. It is applied over indolent tumours, and in pains of the joints. It acts by its stimulating virtue, which is often so considerable as to excite a full crop of inflamed papulæ.

EMPLASTRUM OPII. *Lond.*
Plaster of Opium.

Take of

Hard opium, in powder, half an ounce;
Frankincense, in powder, three ounces;
Lead plaster, one pound.
Water, half a pint.

Add the opium and frankincense to the melted plaster, and boil down with a gentle fire till it acquire the consistence of a plaster.

Ed.

Take of

Opium, in powder, half an ounce;
Burgundy pitch, three ounces;
Plaster of semi-vitrified oxide of lead, one pound.

Add the opium and pitch to the melted plaster, and mix them thoroughly.

OPIUM plaster is applied in rheumatisms and other local pains, and is supposed to act by diminishing the sensibility of the part by contiguous sympathy or absorption.

CERATUM SAPONIS. *Lond.*
Soap Cerate.

Take of

Hard soap, eight ounces;
Yellow wax, ten ounces;
Semi-vitrified oxide of lead, powdered, one pound;
Olive oil, one pint;
Vinegar, one gallon.

Boil the vinegar with the oxide of lead, over a slow fire, constantly stirring, until they unite; then add the soap, and repeat the boiling in the same manner, until the moisture be entirely evaporated; and, lastly, mix with them the wax previously melted with the oil.

It is doubtful whether this composition be consonant to the rules of pharmaceutic chemistry; for the acetate of lead formed must be decomposed by the soap, giving rise to acetate of potass and acetate of lead. These are afterwards blended mechanically with the wax and oil. Mr Wilson mentions a different way of preparing it in use at St Bartholomew's Hospital, where it was much used by Mr Pott. The litharge and vinegar were boiled down carefully till they became glutinous; the soap, wax and oil were melted together, and when both were cooling and merely fluid, they were mixed by incessant stirring. It was used to fractured limbs, as combining the properties of an adhesive plaster with those of a saturnine; but it is a dangerous application while any susceptibility of inflammation remains. As a covering to strumous glands and scrophulous swellings it is less doubtful.

EMPLASTRUM SAPONIS. *Lond. Dub.*
Soap Plaster.

Take of
Hard soap, sliced, half a pound;
Lead plaster, three pounds.
Mix the soap with the melted plaster, and boil them to the thickness of a plaster.

EMPLASTRUM SAPONACEUM. *Ed.*
Saponaceous Plaster.

Take of
Plaster of semi-vitrified oxide of lead, four parts;
Gum plaster, two parts;
Hard soap, sliced, one part.
To the plasters, melted together, add the soap; then boil for a little.

These are supposed to be mild discutients.

UNGUENTUM CARBONATIS PLUMBI. *Ed.*
Ointment of Carbonate of Lead.

Take of
Simple ointment, five parts;
Carbonate of lead, one part.
Mix them thoroughly.

UNGUENTUM CERUSSÆ, sive SUBACETATIS PLUMBI. *Dub.*
Ointment of Ceruse, or of Subacetate of Lead.

Take of
Ointment of white wax, one pound;
Ceruse, in very fine powder, two ounces.
Make into an ointment.

THIS is a cooling desiccative ointment of great use when applied to excoriated surfaces.

UNGUENTUM ACETATIS PLUMBI. *Ed.*
Ointment of Acetate of Lead.

Take of
Simple ointment, twenty parts;
Acetate of lead, in very fine powder, one part.

Dub.

Take of
Ointment of white wax, one pound and a half;
Acetate of lead, one ounce.
Make into an ointment.

CERATUM PLUMBI ACETATIS. *Lond.*
Cerate of Acetate of Lead.

Take of
Acetate of lead, in powder, two drachms;
White wax, two ounces;
Olive oil, half a pint.
Melt the wax in seven fluidounces of the oil, and gradually add to these the acetate of lead, separately triturated with the rest of the oil, and stir the mixture with a wooden spatula until they unite.

THESE are also excellent cooling ointments, of the greatest use in many cases.

CERATUM PLUMBI COMPOSITUM. *Lond.*
Compound Cerate of Lead.

Take of
Solution of subacetate of lead, two fluidounces and a half;
Yellow wax, four ounces;
Olive oil, nine fluidounces;
Camphor, half a drachm.
Mix the melted wax with eight fluidounces of the oil, then remove from the fire; and as soon as the mixture begins to thicken, pour in, by degrees, the solution of subacetate of lead, and stir constantly, with a wooden spatula, until

it be cold; then mix in the camphor, previously melted in the rest of the oil.

This composition was much recommended by M. Goulard. It differs from the other saturnine ointments only in consistence.

UNGUENTUM HYDRARGYRI. *Ed.*
Ointment of Quicksilver.

Take of
Purified quicksilver,
Mutton suet, each one part;
Hogs lard, three parts.
Rub the mercury diligently in a mortar with a little of the hogs lard, until the globules entirely disappear; then add the rest of the fats.

This ointment may also be made with double or triple the quantity of quicksilver.

Dub.

Take of
Purified quicksilver,
Prepared hogs lard, equal weights.
Triturate them together in a marble or iron mortar, until the globules of quicksilver disappear.

UNGUENTUM HYDRARGYRI MITIUS. *Dub.*
Milder Ointment of Quicksilver,

Is made with twice the quantity of lard.

UNGUENTUM HYDRARGYRI FORTIUS. *Lond.*
Stronger Mercurial Ointment.

Take of
Purified quicksilver, two pounds;
Prepared hogs lard, twenty-three ounces;
Prepared mutton suet, one ounce.
First triturate the quicksilver with the suet and a little of the hogs lard, until the globules be extinguished; then add the rest of the lard, and mix.

The making of mercurial ointment is still in some places the torment of surgeons' apprentices, as all attempts at preparing it by machinery have failed, on account of the heat liquefying the fat, and preventing the killing of the quicksilver. Many proposals have been made for diminishing the labour, but they are in general hurtful to the efficacy of the preparation, except the addition of a portion of old mercurial ointment, which, like a ferment, promotes the formation of the new.

UNGUENTUM HYDRARGYRI MITIUS. *Lond.*
Milder Mercurial Ointment.

Take of
The stronger ointment of quicksilver, one pound;
Hogs lard, prepared, two pounds.
Mix them.

LINIMENTUM HYDRARGYRI. *Lond.*
Liniment of Mercury.

Take of
Stronger mercurial ointment,
Prepared lard, of each four ounces;
Camphor, one ounce;
Rectified spirit, fifteen minims;
Water of ammonia, four fluidounces.
First rub the camphor with the spirit, then with the lard and mercurial ointment; lastly, having gradually added the water of ammonia, mix all the ingredients together.

UNGUENTUM OXIDI HYDRARGYRI CINEREI. *Ed.*
Ointment of Grey Oxide of Quicksilver.

Take of
Grey oxide of quicksilver, one part;
Hogs lard, three parts.
Mix them thoroughly.

THESE ointments are principally employed, not with a view to their topical action, but with the intention of introducing mercury in an active state into the circulating system, which may be effected by gentle friction on the sound skin of any part, particularly on the inside of the thighs or legs. For this purpose, these simple ointments are much better suited than the more compounded ones, with turpentine and the like, formerly employed; for, by any acrid substance, topical inflammation is apt to be excited, preventing further friction, and giving much uneasiness. To avoid this, it is necessary, even with the mildest and weakest ointment, to change occasionally the place at which the friction is performed.

It is requisite that the ointments in which the mercury is extinguished by trituration, should be prepared with very great care; for upon the degree of triture which has been employed, the activity of the mercury very much depends.

The addition of the mutton-suet, now adopted by London and Edinburgh, is an advantage to the ointment, as it prevents it from running into the state of oil, which the hogs lard alone, in warm weather, or in a warm chamber, is sometimes apt to do, and which is followed by a separation of the quicksilver. We are even inclined to think, that the proportion of suet, directed by the London College, is too small for this purpose, and, indeed, seems to be principally intended for the more effectual triture of the mercury; but it is much more to be regretted, that in a medicine of such activity, the colleges should not have directed the same proportion of mercury to the fatty matter.

EMPLASTRUM HYDRARGYRI. *Ed.*
Plaster of Quicksilver.

Take of
Olive oil,
White rosin, each one part;
Purified quicksilver, three parts;
Plaster of semi-vitrified oxide of lead, six parts.

Melt the oil and resin together, and when this mixture is cold, let the quicksilver be rubbed with it till the globules disappear; then add, by degrees, the litharge plaster melted, and let the whole be accurately mixed.

EMPLASTRUM HYDRARGYRI. *Lond.*
Plaster of Quicksilver.

Take of
Purified quicksilver, three ounces;
Sulphuretted oil, one fluidrachm;
Litharge plaster, one pound.

Triturate the quicksilver with the sulphuretted oil until the globules disappear; then gradually add the lead plaster melted, and mix the whole together.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. *Lond. Dub.*
Plaster of Gum Ammoniac with Quicksilver.

Take of
Gum ammoniac strained, one pound;
Purified quicksilver, three ounces;
(Sulphuretted oil, a fluidrachm, *Lond.)*
(Turpentine, two drachms, *Dub.)*

Triturate the quicksilver with the sulphuretted oil, (turpentine, *Dub.)* until its globules disappear; then gradually add the gum ammoniac melted, and mix them altogether.

In the one of these preparations, the killed mercury is united with common lead plaster, in the other with strained gum ammoniac. In both, the London College orders the empyreumatic sulphuretted oil for killing the mercury; but it is very offensive, and not, so far as I know, possessed of any advantage over turpentine, or rosin and oil.

These mercurial plasters are considered as powerful resolvents and discutients. They act both generally by affording a continued stimulus to the part to which they are applied, and specifically; the mercury being sometimes introduced into the habit in such quantity as to affect the mouth. Syphilitic pains in the joints and limbs, nodes, tophi, and beginning indurations, are said to yield to them occasionally; and they are sometimes worn with advantage in chronic enlargement and pains of the liver. The ammoniacal plaster is the more stimulating; the common plaster more likely to produce the specific effects of mercury.

UNGUENTUM HYDRARGYRI PRÆCIPITATI ALBI. *Lond.*
Ointment of White Precipitated Quicksilver.

Take of

White precipitated quicksilver, one drachm;

Prepared lard, one ounce and a half.

Add the precipitated quicksilver to the lard melted with a slow fire, and mix.

UNGUENTUM SUBMURIATIS HYDRARGRYI AMMONIATI. *Dub.*
Ointment of Ammoniated Submuriate of Quicksilver.

Take of

Ointment of white wax, one pound;

Ammoniated submuriate of quicksilver, an ounce and a half.

Make into an ointment.

This is a very elegant mercurial ointment, and frequently made use of in the cure of obstinate cutaneous affections.

UNGUENTUM OXIDI HYDRARGYRI RUBRI. *Ed.*
Ointment of Red Oxide of Quicksilver.

Take of

Red oxide of quicksilver by nitric acid, in very fine powder, one part;

Hogs lard, eight parts.
Mix them thoroughly.

UNGUENTUM SUBNITRATIS HYDRARGYRI. *Dub.*
Ointment of Subnitrate of Quicksilver.

Take of
Ointment of white wax, half a pound;
Subnitrate of quicksilver, half an ounce.
Make into an ointment.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI. *Lond.*
Ointment of Nitric Oxide of Quicksilver.

Take of
Nitric oxide of quicksilver, one ounce;
White wax, two ounces;
Prepared lard, six ounces.
Add the nitric oxide, in very fine powder, to the wax and lard, previously melted together, and mix.

THE oxide should be reduced to very fine powder before it be added to the axunge. This is an excellent stimulating ointment, often of very great service in indolent ill-conditioned sores, when we wish to excite them to greater action. As an eye-ointment, its effects are most remarkable, in the cure of all inflammations of the tunica conjunctiva, and more particularly when there is a thickening and swelling of the inner membrane of the palpebræ. In such cases, it seems to act with much greater certainty, if applied immediately after the eyelids have been scarified. In inflammation, accompanied with specks, it has a most powerful effect in removing both. It is also useful in all those ophthalmias which so frequently appear after small pox, measles, and eruptive diseases of the hairy scalp. It is used in the same quantity, and in the same manner as the *Unguentum nitratis hydrargyri*; and if it prove too stimulating, it may be diluted with axunge. It is useful to know that if it be mixed with any ointment containing resin, the red oxide is very quickly converted into the black, and the ointment gradually loses its red colour, and passes through olive-green to black.

UNGUENTUM SUPERNITRATIS HYDRARGYRI. *Dub.*
Ointment of Supernitrate of Quicksilver.

Take of
Distilled quicksilver, one ounce;
Nitrous acid, by weight, two ounces;
Olive oil, one pint;
Prepared hogs lard, four ounces.

Dissolve the quicksilver in the acid; mix the solution with the oil and lard, melted together, and make into an ointment, in the same manner as the ointment of nitrous acid.

UNGUENTUM HYDRARGYRI NITRATIS. *Lond.*
Ointment of Nitrate of Quicksilver.

Take of
- Purified quicksilver, one ounce;
- Nitric acid, eleven fluidrachms;
- Prepared hogs lard, six ounces;
- Olive oil, four fluidounces.

First dissolve the quicksilver in the acid, and then mix the solution, while hot, with the lard and oil previously melted together.

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS; vulgo UNGUENTUM CITRINUM. *Ed.*
Stronger Ointment of Nitrate of Quicksilver, commonly called *Citrine Ointment.*

Take of
- Purified quicksilver, one part;
- Nitrous acid, two parts;
- Olive oil, nine parts;
- Hogs lard, three parts.

Dissolve the quicksilver in the acid; then carefully beat up the solution in a glass mortar, with the lard and oil when getting stiff, after having been melted together.

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. *Ed.*
Milder Ointment of Nitrate of Quicksilver.

This is prepared in the same way (as the Ointment of nitrate of quicksilver,) with three times the quantity of oil and hogs lard.

THIS ointment, which at first has a moderate consistence and a fine golden colour, soon gets very hard, even pulverizable, and becomes gradually green, the change commencing at the surface; and the mode of preparing the *Golden eye ointment*, which remains soft, and of a fine yellow colour, is still a secret. The hardening is very much owing to the excess of acid necessary for dissolving the mercury, as nitric acid alone hardens fat in the same manner. Much has been supposed to depend on the nature of the unctuous matter employed; and it has been said that the superiority of the secret preparation is owing to the use of unsalted butter. Some German pharmaceutists, fearing the corrosiveness of the solution, allow crystals of nitrate of mercury to orm in the solution, dry them, and mix an ounce of them in very minute powder, with nine ounces of lard, and six of olive oil. The property which nitrate of mercury, prepared by ebullition, has, of being decomposed by water, furnished me with an easy but expensive way of getting rid of all excess of acid, and of procuring the subnitrate of mercury in the state of the most minute division possible. An ointment, prepared with this subnitrate, had a most beautiful golden colour; after six months was perfectly soft; and had all the properties desired.

When the citrine ointment is too hard, it should be softened by triturating it with lard or oil; for, if melted with them, it very soon hardens again.

Medical use.—This ointment has the very best effects in herpes, porrigo, and similar obstinate cutaneous affections, and is almost specific in psoropthalmia, in those slight excoriations of the tarsi, attended with extreme itching, and in all the inflammations of the eyes, attended by eruptive disorders of the hairy scalp or face. It is most conveniently and effectually used, by rubbing a piece of the size of half a garden pea, with the point of a hair pencil, over the tarsi, among the roots of the ciliæ, and allowing a small quantity to get on the inner membrane of the palpebræ. In obstinate cases, a weak solution of muriate of mercury, used as a collyrium, along with this ointment, proves a most powerful remedy. Baumé recommends it to be rubbed to the extent of two drachms upon the legs and wrist for nine days for the cure of scabies, and says it sometimes excites salivation.

UNGUENTUM SUBACETATIS CUPRI. *Ed.*
Ointment of Subacetate of Copper.

Take of
Resinous ointment, fifteen parts;
Subacetate of copper, in very fine powder, one part.
Sprinkle the subacetate upon the ointment melted, and stir constantly until the mixture get stiff, on cooling.

UNGUENTUM ÆRUGINIS. *Dub.*
Ointment of Verdigris.

Take of
Ointment of white resin, one pound;
Prepared verdigris, half an ounce.
Make into an ointment.

THIS ointment is used for cleansing sores, and keeping down fungous flesh.

It is also frequently used with advantage in cases of ophthalmia, depending on scrofula, where the palpebræ are principally affected; but when it is to be thus applied, it is, in general, requisite that it should be somewhat weakened by the addition of a proportion of simple ointment or hogs lard.

Mr Wilson says it is the only remedy which is capable of curing the obstinate and malignant variety of ring-worm, said to have been imported from the East Indies. The scalp is to be kept close shaved, washed every night with warm water and soap, and afterwards with bran and water, then rubbed dry, and the ointment applied either with the finger, or lightly spread on lint; and during the whole treatment, which is sometimes tedious, the oil skin cap is to be worn. If the ointment excite pustules or erysipelatous inflammation, its use must be suspended till these be removed.

UNGUENTUM OXIDI ZINCI IMPURI. *Ed.*
Ointment of Impure Oxide of Zinc.

Take of
  Simple liniment, five parts:
  Prepared impure oxide of zinc, one part.
Mix them thoroughly.

UNGUENTUM TUTIÆ. *Dub.*
Ointment of Tutty.

Take of
  Ointment of white wax, ten ounces;
  Prepared tutty, two ounces.
Make into an ointment.

UNGUENTUM OXIDI ZINCI. *Ed.*
Ointment of Oxide of Zinc.

Take of
  Simple liniment, six parts;
  Prepared oxide of zinc, one part.
Mix them thoroughly.

Dub.

Take of
  Ointment of white wax, one pound;
  Oxide of zinc, an ounce and a half.
Make into an ointment.

UNGUENTUM ZINCI. *Lond.*
Ointment of Zinc.

Take of
Oxide of zinc, one ounce;
Prepared lard, six ounces.
Mix.

THESE ointments are chiefly used in affections of the eye, particularly in those cases where redness arises rather from relaxation than from active inflammation.

CERATUM CARBONATIS ZINCI IMPURI. *Ed.*
Cerate of Impure Carbonate of Zinc.

Take of
Simple cerate, five parts;
Prepared impure carbonate of zinc, one part.
Mix them thoroughly.

CERATUM CALAMINÆ. *Lond.*
Cerate of Calamine.

Take of
Calamine, prepared,
Yellow wax, of each half a pound;
Olive oil, one pint.
Mix the oil with the melted wax, then remove from the fire; and, as soon as the mixture begins to thicken, add the calamine, and stir the cerate constantly until it be cold.

UNGUENTUM CALAMINARIS. *Dub.*
Calamine Ointment.

Take of
Ointment of yellow wax, five pounds;
Prepared calamine, one pound.
Make into an ointment.

THESE compositions resemble the cerate which Turner strongly recommends in cutaneous ulcerations and excoriations, and which has been usually distinguished by his name. They appear, from experience, to be excellent epulotics; and, as such, are frequently made use of in practice.

EMPLASTRUM OXIDI FERRI RUBRI. *Ed.*
Plaster of Red Oxide of Iron.

Take of
Plaster of semi-vitrified oxide of lead, twenty-four parts;
White rosin, six parts;
Yellow wax,

Olive oil, each three parts;
Red oxide of iron, in powder, eight parts.

Grind the red oxide of iron with the oil, and then add it to the other ingredients, previously melted, and mix the whole thoroughly.

EMPLASTRUM THURIS. *Dub.*
Plaster of Frankincense.

Take of
Plaster of litharge, two pounds;
Frankincense, half a pound;
Red oxide of iron, three ounces.

Sprinkle the oxide into the plaster and frankincense, melted together, stirring the mixture at the same time, and make into a plaster.

THIS plaster is used in weakness of the large muscles, as of the loins; and its effects seem to proceed from the mechanical support given to the part, which may also be done by any other plaster that adheres with equal firmness.

TABLES,

Shewing the Proportion of ANTIMONY, OPIUM, *and* QUICKSILVER, *contained in some of their Compounds.*

TARTRATE OF ANTIMONY.

	One grain in
Wine of Tartarized Antimony contains one grain of tartarized antimony in four fluidrachms. *Lond.*	220
Wine of Tartrate of Antimony contains two grains of tartrate of antimony in each ounce. *Ed.*	240

OPIUM.

Pills of Storax, in five grains of the mass, contain one grain of purified opium. *Dub.*	5
Pills of Soap with Opium contain one grain of opium in five. *Lond.*	5
Compound Powder of Ipecacuan contains one grain of opium in ten grains. *Lond. Dub.*	10
Powder of Ipecacuan and Opium contains six grains of opium in each drachm, or one grain in ten. *Ed.*	10
Powder of Burnt Horn with Opium contains one grain of opium in ten. *Lond.*	10
Opiate Pills contain six grains of opium in each drachm, or a pill of five grains contains half a grain of opium. *Ed.*	10
Opiate Powder contains one grain in ten. *Ed.*	10
Tincture of Opium contains, in a drachm measure, about four grains and a half of purified opium. *Dub.*	13
Tincture of Opium is made with two scruples of opium to each ounce of the liquid, or with five grains to each drachm; but a drachm of the tincture appears, by evaporation, to contain about three grains and a half of opium. *Ed.*	17
Wine of Opium contains about three grains in one fluidrachm.	20
Compound Powder of Kino contains a grain of opium in a scruple. *Lond.*	20
Tincture of Soap and Opium is made with one scruple of opium in each ounce of the liquid. *Ed.*	24
Confection of Opium contains one grain of opium in about thirty-six grains. *Lond.*	36
Opiate Electuary contains in each drachm about a grain and a half of opium. *Ed.*	40
Compound Powder of Chalk with Opium contains one grain of opium in two scruples. *Lond.*	40
Ammoniated Tincture of Opium is made with about eight grains in each ounce of the liquid, or with about one grain in the drachm. *Ed.* Scotch paregoric.	60
Troches of Liquorice with Opium contain about one grain of opium in each drachm. *Ed.*	60
Compound Electuary of Catechu contains in each ounce about two grains and a half of opium; for one grain of opium is contained in one hundred and ninety-three grains. *Ed.*	193
Camphorated Tincture of Opium is made with two grains of opium in each ounce of liquid. *Ed.* English paregoric.	240

	One in
Camphorated Tincture of Opium contains in four drachms and a half, by measure, very nearly one grain of purified opium. *Dub.*	270
Compound Electuary of Catechu contains in each ounce about two grains and a half of purified opium. *Dub.*	480
Syrup of Opium contains in an ounce measure about a grain of the watery extract of opium ; for the bulk of the liquor, by the addition of the sugar, is more than doubled. *Dub.*	480
QUICKSILVER.	
Quicksilver Pills contain nearly fifteen grains of quicksilver in each drachm. Each pill contains one grain of quicksilver. *Ed.*	4
Quicksilver Pills contain one grain of quicksilver in three grains. *Lond.*	3
Quicksilver Pills contains in six grains two of quicksilver. *Dub.*	3
Compound Pills of Submuriate of Quicksilver contain a grain of submuriate of quicksilver in about four grains. *Lond.*	4
Compound Pills of Submuriate of Quicksilver contain in about four grains one grain of submuriate of quicksilver. *Ed.*	4
Quicksilver with Chalk contains one grain of quicksilver in about three grains. *Lond.*	3
Quicksilver with Magnesia, in three grains, contains two of quicksilver. *Dub.*	1.5
Quicksilver Ointment contains twelve grains of quicksilver in each drachm. *Ed.*	
Made with double quicksilver, each drachm contains twenty-four grains. *Ed.*	2.5
Stronger Quicksilver Ointment contains one drachm of quicksilver in two drachms. *Lond. Dub.*	2
Weaker Quicksilver Ointment contains one drachm of quicksilver in six drachms. *Lond.*	6
Quicksilver Liniment contains one drachm of quicksilver in about six drachms. *Lond.*	6
Quicksilver Plaster contains about sixteen grains of quicksilver in each drachm. *Ed.*	5
Stronger Ointment of Nitrate of Quicksilver contains in each drachm four grains of quicksilver. *Ed.*	15
Milder Ointment of Nitrate of Quicksilver contains in each drachm a grain and a half of quicksilver. *Ed.*	40
Ointment of Grey Oxide of Quicksilver contains about fifteen grains of oxide in each drachm. *Ed.*	4
Ointment of Red Oxide of Quicksilver contains in each drachm about seven grains of oxide. *Ed.*	8.5
Solution of Oxymuriate of Quicksilver contains one grain of oxymuriate of mercury in two fluidounces. *Lond.*	913
ARSENIC.	
Solution of Arsenic contains one grain of sublimed white arsenic in two fluidrachms. *Lond.*	114
Arsenical Solution contains in each drachm half a grain of oxide. *Ed.*	120

POSOLOGICAL AND PROSODIAL TABLE.

ACACIÆ ārăbĭcæ gummi, ʒ i to ℥ i ; demulcent.

Emulsĭo acaciæ arabicæ, ℔ i to ℔ ij, *daily ;* diluent.

Mucilāgo acaciæ arabicæ, ʒ i to ℥ i ; demulcent.

Trochisci gummosi, ʒ i to ʒ ij ; demulcent.

Acaciæ catĕchu extractum, gr x to ℈ i ; astringent.

Electuārĭum acaciæ catechu, ℈ i to ʒ i ; astringent.

Infūsum acaciæ catechu, ℥ i to ℥ iij ; astringent.

Tinctūra acaciæ catechu, ʒ i to ʒ ij ; astringent.

Acētum, ʒ i to ℥ ſs : internally refrigerant ; ℥ i to ℥ ij, *in glysters ;* cathartic.

Syrūpus aceti, ʒ i to ℥ ſs ; expectorant.

Oxȳmel, ʒ i to ℥ ſs ; demulcent.

Acĭdum acētĭcum tenue, ʒ i to ℥ ſs ; refrigerant.

Acidum aceticum camphoratum ; vapour, stimulant, pungent.

Acidum aceticum scillĭtĭcum, ʒ ſs to ʒ i ; expectorant, emetic.

Acidum benzoicum, gr x to ℥ ſs, expectorant, stimulant.

Acidum citrĭcum crystallizātum, gr x to ʒ ſs ; refrigerant, and for effervescing draughts.

Acidum muriāticum, ♏ x to ♏ xl ; refrigerant.

Acidum muriaticum dilutum, ʒ ſs to ʒ i ; refrigerant.

Acidum nitrĭcum vel nitrōsum, ♏ v to ♏ xx : refrigerant.

dilūtum, ♏ x to ♏ xl ; or ʒ ij *daily*, refrigerant.

Acidum succinicum ; refrigerant.

Acidum sulphurĭcum dilūtum, ♏ x to ♏ xl ; refrigerant, antidiaphoretic.

aromatĭcum, ♏ x to ♏ xl ; refrigerant.

Acidum tartaricum, gr x to ℈ i ; refrigerant, for effervescing draughts.

Aconīti napelli folia, gr i to gr v ; anodyne, narcotic.

Succus spissātus aconīti napelli, gr ſs to gr iij ; anodyne, narcotic.

Acŏri calami radix ; aromatic.

Adeps ; emollient externally.

Æsculi hippocastăni cortex, ʒ ſs to ʒ i ; astringent, bitter.

Agrimonia eupatoria ; astringent.

Æther sulphurĭcus, ♏ xx to ʒ i ; stimulant.

cum alcohole, ʒ ſs to ʒ ij ; stimulant.

aromaticus, ʒ ſs to ʒ ij ; stimulant.

Spiritus ætheris sulphurici comp., ʒ ſs to ʒ ii ; stimulant.

Oleum æthereum ; stimulant, diffusible.

Æther nitrosus ; stimulant, diffusible.

Ætheris nitrĭci spīrĭtus, ʒ ſs to ʒ ij ; stimulant, diuretic.

Alcohol, ʒ ſs to ʒ i ; stimulant.

Alcohol fortius, ʒ ii to ℥ ſs ; stimulant.

Alcohol dilutius, ℥ ſs to ℥ ii ; stimulant.
Alcohol ammoniatum, ʒ ſs to ʒ i ; stimulant, antacid.
aromaticum, ʒ ſs to ʒ i ; ditto.
fœtidum, ʒ ſs to ʒ i ; ditto, antihysteric.
succinatum, ♏ x to ♏ xl ; ditto, ditto.
Allii porri succus, ʒ i to ℥ ſs ; expectorant, lithontriptic.
Allii satīvi succus, ʒ i to ℥ ſs ; expectorant.
Allium cepa ; externally as cataplasm.
Aloës extractum, g^{r} v to g^{r} xx ; cathartic.
Decoctum aloës, ℥ ſs to ℥ ij ; cathartic.
Pilulæ aloëticæ, g^{r} x to ℈ i ; cathartic.
Pilulæ aloës et assæfœtidæ, g^{r} x to ℈ i ; antispasmodic.
Pilulæ aloës et myrrhæ, g^{r} x to ℈ i ; cathartic.
Pulvis aloës composĭtus, g^{r} x to ℈ i ; cathartic, antarthritic.
Pulvis aloës cum canella, g^{r} x to ℈ i ; cathartic.
Tinctūra aloës, ʒ ſs to ʒ ij ; tonic ; ℥ ſs to ℥ i cathartic.
Tinctura aloës et myrrhæ, ʒ ſs to ʒ ij ; laxative, tonic.
Tinctura aloës ætherea, ʒ ſs to ʒ ij ; tonic, stimulant.
Vinum aloës, ℥ ſs to ℥ i ; cathartic.
Althææ officinalis decoctum, ℔ i to ℔ ij *daily ;* demulcent.
Syrūpus althææ officinalis, ʒ i to ʒ ij ; demulcent.
Alūmen, g^{r} x to ℈ i ; astringent.
Pulvis alumĭnæ composĭtus, g^{r} x to ʒ ſs ; astringent.
Alumen exsiccatum ; externally, escharotic.
Ammōniæ aqua, ♏ v to ♏ x ; stimulant, antacid.
dilūta, ♏ xv to ʒ ſs ; stimulant, antacid.
Aqua acetatis ammōniæ, ʒ ij to ℥ ſs ; diaphoretic.
Subcarbōnas ammōniæ, g^{r} v to ℈ i ; stimulant, antacid, emetic.
Solūtio subcarbonatis ammoniæ, ♏ xx to ʒ iſs ; stimulant, antacid.
Hydro-sulphurētum ammoniæ, ♏ v to ♏ x ; sedative.
Murias ammoniæ, g^{r} x to ʒ ſs ; diaphoretic.
Oleum ammoniatum ; external, rubefacient.
Ammoniăcum, g^{r} x to ʒ ſs ; expectorant.
Mistūra ammoniaci, ℥ ſs to ℥ i ; expectorant.
Emplastrum ammoniaci ; discutient.
Amomi zingiberis pulvis, g^{r} v to ℈ i ; spicy, carminative.
Syrupus amomi zingiberis, ʒ i to ʒ ij ; spicy, carminative.
Tinctura amomi zingiberis, ʒ i to ʒ ij ; spicy, carminative.
Amomi repentis pulvis, g^{r} v to ℈ i ; spicy, carminative.
Tinctūra amomi repentis, ʒ i to ʒ ij ; spicy, carminative.
Tinctura amomi repentis composĭta, ʒ i to ʒ ij ; spicy, carminative.
Amomi zedoariæ pulvis, g^{r} v to ℈ i ; carminative.
Amygdali communis oleum fixum, ℥ ſs to ℥ i ; demulcent.
Emulsio amygdali communis, ℔ i to ℔ ij ; demulcent, diluent.
Confectio amygdalæ, ʒ i to ℥ ſs ; demulcent.
Amȳli mucilago, ʒ i to ℥ i ; demulcent ; ℥ iv to ℥ viij *in glysters.*
Trochisci amȳli, ʒ i to ʒ ij ; demulcent.
Amȳrĭdis gileădensis resīna liquida, ♏ x to ʒ ſs ; stimulant.
Unguentum elemi ; detersive.
Anēthi grăvĕōlentis aqua distillāta, ℥ i to ℥ iv ; aromatic.

Anethi fœniculi aqua distillāta, ℥ i to ℥ iv; aromatic.
  Oleum volatile anethi fœniculi, ♏ ij to ♏ v; aromatic.
Angelicæ archangelicæ radix; aromatic.
Anthemĭdis nobĭlis flōres, ℈ i to ʒ i; bitter, tonic.
  Extractum anthemidis nobilis, g x to ʒ ſs; bitter, tonic.
  Infūsum anthemidis nobilis, ℥ ſs to ℥ ij; bitter, tonic; warm, emetic.
  Oleum anthemidis nobilis, ♏ v to ♏ x; carminative.
  Decoctum anthemidis *for glysters.*
Anthemidis pyrĕthri rādix, ℈ i to ʒ ſs; chewed, sialogogue.
Antimōnii oxĭdum, g^{r} i to g^{r} x; diaphoretic.
  Oxĭdum antimonii cum phosphāte calcis, g^{r} v to g^{r} x; diaphoretic.
  Sulphurētum antimonii præparātum, g^{r} v to ℈ ij; diaphoretic.
  Sulphuretum antimonii præcipĭtātum, g^{r} i to g^{r} v; purgative.
  Tartras antimonii, g^{r} $\frac{1}{4}$ to g$_{r}$ ſs, sedative; g^{r} i to g^{r} iij; emetic.
  Vinum tartratis antimonii, *Ed.* ʒ ij to ʒ iv; emetic.
  Vinum antimonii tartarizāti, *Dub.* ʒ i to ʒ ij; emetic.
Appii petrosĕlīni aqua distillāta, ℥ i to ℥ ij; carminative.
Arbŭti ūvæ ursi pulvis, g^{r} x to ℈ ij; astringent.
Arctii lappi radix; astringent.
Arctii lappi semina.
Argenti nitras, g^{r} $\frac{1}{8}$ to g^{r} $\frac{1}{4}$; (Haygarth, g^{r} v?) antiepileptic.
Ari macŭlāti radix, g^{r} v to ℈ i; errhine.
Aristolochiæ serpentāriæ radix, g^{r} x to ʒ ſs; stimulant.
  Tinctūra aristolochiæ serpentariæ, ʒ i to ʒ ij; stimulant.
Arnĭcæ montānæ herba, g^{r} v to g^{r} x; stimulant.
Aromaticus pulvis, g^{r} v to g^{r} x; aromatic.
Aromatica confectio, ℈ i to ʒ i; aromatic.
Aromaticum emplastrum; stimulant.
Arsenĭci oxĭdum album, g^{r} $\frac{1}{8}$ to g^{r} $\frac{1}{4}$; febrifuge.
  Solūtio arsenicālis, ♏ v to ♏ x; febrifuge.
Artĕmisiæ absinthii herba, ℈ i to ʒ i; tonic, bitter.
  Extractum artemisiæ absinthii, ℈ ſs to ʒ ſs; tonic, bitter.
Artemisiæ maritĭmæ cacūmina, ℈ i to ℈ ij; tonic, bitter.
Artemisiæ santonĭcæ cacumina, ʒ ſs to ʒ i; bitter, vermifuge.
Avenæ sativæ farina; in gruel, demulcent.
Asări Europæi pulvis compositus, g^{r} v to g^{r} x; errhine.
Aspidii filĭcis māris pulvis, ʒ i to ʒ ij; anthelmintic.
Astragali tragacanthæ gummi, g^{r} x to ʒ i; demulcent.
  Mucilago astragali tragacanthæ, ʒ i to ʒ ij; demulcent.
Atropæ belladonnæ folia, g^{r} ſs to g^{r} v; narcotic.
  Succus spissatus atropæ belladonnæ, g^{r} ſs to g^{r} iij.
Barytæ muriatis solutio, ♏ v to ♏ x; tonic.
Bismuthi subnitras, g^{r} iij to gr v; tonic.
Bitūmen petrolĕum sulphurātum, g^{r} x to ʒ ſs; stimulant.
Bonplandiæ trifoliātæ pulvis, g^{r} x to ʒ i; tonic, bitter.
  Infusum bonplandiæ trifoliatæ, ℥ ſs to ℥ iv; tonic, bitter.
  Tinctura bonplandiæ trifoliatæ, ʒ ſs to ʒ i; bitter, tonic.
Bubōnis galbăni gummi resina, g^{r} x to ℈ i; expectorant, fœtid.
  Pilulæ galbani compositæ, g^{r} x to ℈ i; expectorant, fœtid.
  Tinctūra galbani, ʒ i to ʒ ij; fœtid, expectorant.

Emplastrum galbani; antispasmodic.
Calx; chemical escharotic.
Calcis ăquă, ℥ ij to ℥ iv; antacid, lithontriptic.
Calcis linimentum; external against burns.
Carbōnas calcis præparātus, ℈ i to ʒ ii; antacid, astringent.
Mistūra carbōnatis calcis, ℥ i to ℥ ij; antacid, astringent.
Pulvis carbonatis calcis compositus, ʒ ſs to ʒ i; antacid, astringent.
Trochisci carbonatis calcis, ʒ i to ʒ ij; antacid, astringent.
Solutio muriatis calcis, ♏ xl to ʒ ſs; tonic.
Camphŏræ pulvis, gr iij to gr x; stimulant, narcotic.
Emulsiō camphorāta, ℥ ſs to ℥ ij; stimulant.
Oleum camphoratum; external stimulant.
Canellæ albæ pulvis, gr x to ℈ i; spicy, stimulant.
Capsĭci annui fructus, gr v to gr x; acrid, stimulant.
Tinctura capsici annui, ʒ i to ʒ ij; acrid, stimulant.
Cantharĭdis vesicatōrii pulvis, gr ſs to gr ii; diuretic.
Tinctura cantharidis vesicatorii, ʒ ſs to ʒ ij; diuretic.
Carbo ligni, ʒ ij to ℥ ſs; antiseptic, febrifuge.
Cardamīnis pratensis flores, ℈ i to ʒ i; antispasmodic, antiscorbutic.
Cari carŭi oleum essentiale, ♏ ii to ♏ v; carminative.
Spiritus cari carui, ʒ i to ℥ ſs; carminative.
Aqua cari carui, ℥ ij to ℥ iv; aromatic.
Cassiæ fistŭlæ electuarium, ʒ i to ℥ i; lenitive;
Cassiæ sennæ folia, ℈ i to ʒ i; cathartic.
Electuarium sennæ compositum, ʒ ſs to ℥ ſs; cathartic.
Infūsum cassiæ sennæ, ℥ i to ℥ iv; cathartic.
Infusum sennæ compositum, ℥ i to ℥ ij; cathartic.
Pulvis sennæ compositus, ℈ i to ʒ i; cathartic.
Syrūpus cassiæ sennæ, ʒ ij to ℥ i; cathartic.
Tinctura cassiæ sennæ, ℥ ſs to ℥ i; cathartic.
Castŏrĕum, gr x to ℈ i; antispasmodic.
Tinctūra castorei, ʒ ſs to ʒ i; antispasmodic.
Tinctura castorei composita, ʒ ſs to ʒ i; antispasmodic.
Centaureæ benĕdictæ herba, ℈ i to ʒ i; bitter, tonic.
Cerevisiæ fermentum, ℥ i to ℥ ii; febrifuge.
Cerevisiæ cataplasma; antiseptic.
Chironĭæ centaurii summitates, ℈ i to ʒ i; bitter, tonic.
Cinchonæ lancifoliæ pulvis, gr x to ʒ ſs; febrifuge.
Decoctum cinchonæ lancifoliæ, ℥ i to ℥ iv; tonic.
Extractum cinchonæ lancifoliæ, gr x to ʒ ſs; tonic.
Extractum resinosum cinchonæ lancifoliæ, gr v to ʒ ſs.
Infusum cinchonæ lancifoliæ, ℥ i to ℥ iv; tonic.
Tinctura cinchonæ lancifoliæ; ʒ i to ʒ ij; tonic.
Tinctura cinchonæ lancifoliæ composita, ʒ i to ʒ ij; tonic.
Tinctura cinchonæ lancifoliæ ammoniata, ʒ ſs to ʒ i; stimulant.
Citri aurantĭi aqua, ℥ i to ℥ ij; aromatic.
Conserva citri aurantii, ʒ i to ℥ i; bitter, aromatic.
Cortex citri aurantii, ℈ i to ℈ iij; bitter, aromatic.
Infusum aurantii compositum, ℥ i to ℥ iv; bitter.
Syrupus citri aurantii, ʒ i to ʒ ij; bitter, aromatic.

Tinctura citri aurantii, ʒ ſs to ʒ i; bitter, aromatic.
Citri medĭcæ succus, ʒ i to ℥ ſs; refrigerant.
Aqua citri medicæ, ℥ i to ℥ ij; aromatic.
Oleum volatile citri medicæ, ♏ ii to ♏ v; aromatic.
Syrupus citri medicæ, ʒ i to ʒ ij; demulcent.
Coccus cacti, gr v to ℈ i; antispasmodic.
Cochleariæ armorăciæ spirĭtus compositus, ʒ i to ℥ i; stimulant.
Infusum armoraciæ compositum, ℥ i to ℥ iv; stimulant.
Colchĭci autumnālis acetum, ʒ ſs to ʒ iſs; narcotic.
Oxymel colchici autumnalis, ʒ i to ʒ ij; narcotic.
Syrupus colchici autumnalis, ʒ i to ʒ ij; narcotic.
Vinum colchici autumnalis, ʒ i to ʒ ij; narcotic.
Spiritus colchici ammoniatus, ʒ i to ʒ ij; narcotic.
Pulvis colchici autumnalis, gr i to gr v; diuretic.
Colombæ pulvis, ℈ i to ʒ ſs; bitter, tonic.
Infusum colombæ, ℥ i to ℥ iv; bitter, tonic.
Tinctura colombæ, ʒ i to ʒ ij; bitter, tonic.
Conĭi macŭlāti pulvis, gr ii to ℈ i; sedative, narcotic.
Extractum conii maculati, gr i to gr v; narcotic.
Tinctura conii maculati, ʒ ſs to ʒ i; narcotic.
Convolvŭli scammōniæ gummi resina, gr v to gr xv; cathartic.
Electuarium scammoniæ, ℈ i to ʒ i; cathartic.
Pulvis scammoniæ compositus, gr x to gr xx; cathartic.
Convolvuli jalapæ pulvis, gr x to ʒ ſs; cathartic.
Extractum jalapæ, gr v to gr xv; cathartic.
Extractum jalapæ resinōsum, gr x to gr xv; cathartic.
Pulvis jalapæ compositus, ʒ ſs to ʒ i; cathartic.
Tinctura jalapæ composita, ʒ i to ℥ ſs; cathartic.
Copaiferæ officinalis resina, gr xv to ʒ i; tonic, diuretic.
Cornu ustum, ʒ ſs to ʒ ij; inert.
Mistūra cornu usti, ℥ iv to ℥ viii; demulcent.
Pulvis cornu cum opio, gr xv to ʒ ſs; anodyne.
Crŏci satīvi syrupus, ʒ i to ʒ ij; stimulant.
Tinctura croci sativi, ʒ i to ʒ ij; stimulant.
Pulvis croci, gr x to ʒ i; emmenagogue.
Crotōnis eleutheriæ cortex, ℈ i to ʒ i; stimulant.
Extractum crotonis eleutheriæ, gr x to ʒ ſs; stimulant.
Infūsum crotonis eleutheriæ, ℥ i to ℥ iv; stimulant,
Tinctura crotonis eleutheriæ, ʒ i to ʒ ij; stimulant.
Crotonis tiglii oleum, ♏ i to ♏ iij; cathartic.
Cŭcŭmĕrĭs colocynthĭdis extractum, gr i to gr v; cathartic.
Extractum colocynthidis compositum, gr v to ʒ ſs; cathartic.
Pilulæ colocynthidis compositæ, gr v to ℈ i; cathartic.
Cupri sulphas, gr i, tonic, to gr x; emetic.
Pilulæ ammoniarētum cupri, gr v to gr xv; antiepileptic.
Subăcētas cupri, gr $\frac{1}{2}$ to gr $\frac{1}{8}$;
Liquor cupri ammoniati, ʒ i to ʒ v;
Daphnes mezerei decoctum, ℥ i to ℥ ij; acrid, antisyphilitic.
Datūræ stramōnĭi herba, gr i to gr v; narcotic.
Extractum daturæ stramonĭi, gr $\frac{1}{2}$ to gr v; narcotic.

Dauci carotæ pulvis, ℈ i to ʒ i; diuretic.
Delphinĭi staphisāgriæ semĭna, gr v to gr x; narcotic.
Dianthi carўophylli syrupus, ʒ i to ʒ ij; aromatic.
Digitālis purpūreæ pulvis, gr ſs to gr v; diuretic, narcotic.
  Infusum digitalis purpureæ, ℥ ſs to ℥ ij; diuretic.
  Decoctum digitalis purpureæ, ʒ i to ʒ ij; diuretic.
  Tinctura digitalis purpureæ, ♏ x to ♏ lx; diuretic.
Dolĭchi prurientis pūbes, gr v to gr x; anthelmintic.
Dorstēniæ contrayĕrvæ radix, gr x to ʒ ſs; stimulant.
  Pulvis contrayervæ compositus, ℈ i to ℈ ij; aromatic.
Elatērĭi extractum, gr ſs to gr iij; cathartic.
Eryngĭi maritĭmæ radix, ʒ i to ʒ ij; nutritious.
Eugeniæ caryophyllatæ oleum, ♏ iij to ♏ v; carminative.
  Infusum caryophyllorum, ℥ i to ℥ v; aromatic.
Euphorbii officinālis gummi resīna, gr i; purgative.
Ferri limatūra, gr iij to gr x; tonic.
  Carbōnas ferri præcipitatus, gr iij to gr x; tonic.
  Aqua supercarbōnatis ferri, ℥ ij to ℥ iv; tonic.
  Aqua ferri alkalīni, ʒ ſs to ʒ i; tonic.
  Mistura ferri composita, ℥ i to ℥ ij; tonic.
  Pilulæ ferri composit., gr x to ℈ i; tonic.
  Murias ammōniæ et ferri, gr iij to gr xv; deobstruent.
  Oxidum ferri nigrum purificātum, gr iij to gr x; tonic.
  Pilŭlæ sulphatis ferri, gr x to ℈ i; tonic.
  Subcarbōnas ferri praeparātus, gr iij to gr x; tonic.
  Sulphas ferri, gr i to gr v; tonic.
  Tartras ferri et potassae, gr v to ℈ i; tonic.
  Tinctura ferri acētāti, ♏ x to ♏ xxx; diuretic.
  Tinctura muriatis ferri, ♏ x to ♏ xx; diuretic.
  Tinctura muriatis ferri et ammoniae, ♏ x to ʒ ſs;
  Vinum ferri, ʒ i to ℥ ſs; tonic, diuretic.
Ferŭlae assaefoetidae gummi resīna, gr x to ʒ ſs; antispasmodic.
  Mistura ferulae assaefoetidae, ℥ ſs to ℥ i; antispasmodic.
  Pilulae ferulae assaefoetidae, gr x to gr xx; antispasmodic.
  Tinctura ferulae assaefoetidae, ʒ ſs to ʒ i; antispasmodic.
  Tinctura ferulae assaefoetidae ammoniata, ʒ ſs to ʒ i; antispasmodic.
Fici caricae fructus; demulcent.
Fucus vesicatorius; externally in cataplasm.
Gallae tinctura, ʒ i to ʒ ij; astringent.
Gambōgia, gr ij to gr x; cathartic.
  Pilulae gambōgiae compositae, gr x to ℈ i; cathartic.
Gentiānae lutĕae extractum, gr x to ʒ ſs; bitter, tonic.
  Infūsum gentianae luteae, ℥ i to ℥ iv; bitter, tonic.
  Tinctura gentianae composita, ʒ i to ʒ ij; bitter, tonic.
  Vinum gentianae compositum, ℥ ſs to ℥ i; bitter, tonic.
Geoffraeae inermis decoctum, ℥ i; anthelmintic.
Gei urbani pulvis, ℈ i to ʒ ſs; astringent.
Glycyrrhīzae glabrae extractum, ʒ ſs to ʒ i; demulcent.
  Trochisci glycyrrhizae glabrae, ʒ ſs to ʒ i; demulcent.
  Trochisci glycyrrhizae glabrae cum opio, ʒ ſs to ʒ i; demulcent, anodyne.

Gratiŏlae officinālis herba, gr x to ℈ i; purgative.
Guaiăci officinalis decoctum, ℥ ij to ℥ iv.

Resina guaiaci officinalis, gr x to ʒ ſs; cathartic, sudorific.

Mistura guaiaci officinalis, ℥ i to ℥ ij; cathartic.

Tinctura guaiaci officinalis, ʒ i to ʒ ij; cathartic.

Tinctura guaiaci officinalis ammoniata, ʒ i to ʒ ij; sudorific.

Haematoxȳli Campechiāni extractum, ℈ i to ℈ ij; astringent.

Hellĕbŏri nigri extractum, gr v to gr x; cathartic, narcotic.

Pulvis hellebori nigri, gr x to ʒ ſs; cathartic, emmenagogue.

Tinctura hellebori nigri, ʒ ſs to ʒ i; emmenagogue, cathartic.

Hordĕi distĭchi decoctum, ℥ ij to ℥ iv; demulcent.

Decoctum hordei compositum, ℥ ij to ℥ iv; demulcent.

Cerevisiae fermentum, ℥ i to ℥ ij; antiseptic.

Hŭmŭli lupŭli extractum, gr v to ℈ i; anodyne.

Tinctura humuli lupuli, ♏ xxx to ♏ l; anodyne.

Hydrargȳrum purificatum, ℥ ſs to ℥ iv; cathartic.

cum creta, gr v to ℈ i; alterative.

cum magnesia, gr v to ℈ i; alterative.

Acētas hydrargȳri, gr i to gr v; specific.

Murias hydrargyri corrosīvus, gr $\frac{1}{8}$ to gr $\frac{1}{2}$; specific.

Liquor muriatis hydrargyri, ʒ i to ℥ ſs; specific.

Oxidum hydrargyri cinereum, gr ij to gr x; specific.

Oxidum hydrargyri rubrum, gr ſs to gr ij; externally corrosive.

Pilulae hydrargyri, gr v to gr xv; alterative, purgative, sialogogue, specific.

Submurias hydrargyri mitis, gr ſs to gr ii; alterative; gr v to ℈ xv; purgative.

Submurias hydrargyri praecipitatus, gr i to gr v; alterative.

Pilulae submuriatis hydrargyri compositae, gr v to gr xv; alterative.

Hydrargyrum praecipitatum album, gr v to gr x.

Subsulphas hydrargyri flavus, gr i to gr v; emetic.

Sulphurētum hydrargyri nigrum, ℈ i to ℈ ij; alterative.

Sulphuretum hydrargyri rubrum, gr x to ℈ i; fumigation, specific.

Hyosciămi nigri succus spissatus, gr v to ℈ i; anodyne.

Tinctura hyosciami nigri, ♏ xx to ♏ xl; anodyne.

Hyssōpi officinalis herba, ℈ i to ʒ i; aromatic.

Inŭlae helĕnii radix, ℈ i to ʒ i; demulcent.

Ipecacuanhae pulvis, gr ſs to gr ij; expectorant; gr xx to ʒ ſs; emetic.

Pulvis ipecacuanhae compositus, gr x to ʒ i; sudorific, anodyne.

Vinum ipecacuanhae, ♏ x to ♏ xl; expectorant; ℥ ſs to ℥ i; emetic.

Iris florentinae radix; aromatic.

Junipĕri communis oleum volatile, ♏ ij to ♏ x; diuretic.

Spiritus juniperi compositus, ℥ ſs to ℥ i; diuretic.

Pulvis baccarum juniperi, ʒ ſs to ʒ i; diuretic.

Juniperi sabinae extractum, gr x to ℈ i; cathartic, emmenagogue.

Oleum volatĭle juniperi sabinae, ♏ v to ♏ x; cathartic, emmenagogue.

Pulvis juniperi sabinae; cathartic, acrid.

Juniperi lyciae gummi resina; masticatory.

Kīno pulvis, gr x to ℈ i; astringent.

Pulvis kino compositus, gr x to ℈ i; astringent.

Tinctura kino, ʒ ſs to ʒ i; astringent.
Krameria triandra; astringent.
Lactūcae virosae succus spissatus, g^r iij to g^r v; diuretic.
Lactūcārium, g^r iij to g^r v; anodyne.
Tinctura lactucarii, ♏ l to ʒ ſs; anodyne.
Lavandŭlae spicae oleum volatile, ♏ ij to ♏ v; aromatic.
Spiritus lavandulae spicae, ʒ ſs to ʒ i; aromatic.
Spiritus lavandulae spicae compositus, ℥ ſs to ℥ i; aromatic, stimulant.
Lauri cassiae pulvis, g^r v to ℈ i; aromatic.
Aqua lauri cassiae, ℥ i to ℥ ij; aromatic, warm.
Lauri cinnamōmi pulvis, g^r v to ℈ i; aromatic.
Aqua lauri cinnamomi, ℥ ſs to ℥ i; aromatic, warm.
Oleum lauri cinnamomi, ♏ i to ♏ ij; caustic, aromatic.
Spiritus cinnamomi, ʒ ſs to ʒ i; stimulant, aromatic.
Tinctura cinnamomi, ʒ i to ʒ ij; stimulant, aromatic.
Tinctura cinnamomi composita, ʒ ſs to ʒ ij; stimulant, aromatic.
Lauri sassăfras lignum vel radix, ℈ i to ʒ i; aromatic.
Oleum essentiale lauri sassafras, ♏ ij to ♏ x; aromatic.
Leontŏdi taraxăci extractum, g^r x to ʒ ſs; bitter, diuretic.
Lichēnis islandici decoctum, ℥ i to ℥ ij; demulcent.
Lini usitatissimi infusum, ℥ i to ℥ ij; demulcent.
Oleum lini usitatissimi, ℥ ſs to ℥ i; cathartic.
Macis, g^r v to g^r x; aromatic, fragrant.
Magnēsia, g^r x to ℈ i; cathartic, antacid.
Carbōnas magnesiae, ℈ i to ʒ i; cathartic, antacid.
Sulphas magnesiae, ʒ i to ℥ i; cathartic, antacid.
Manna, ℥ ſs to ℥ ij; laxative.
Malvae decoctum compositum, ℥ iv to ℥ viii; enema.
Melăleucae leucădendri oleum volatile, ♏ iij to ♏ v; stimulant.
Melissae officinalis folia; aromatic.
Menthae piperītae aqua, ℥ i to ℥ iv; aromatic.
Oleum volatile menthae piperitae, ♏ ij to ♏ v; carminative.
Spiritus menthae piperitae, ℥ ſs to ℥ i; carminative, stimulant.
Menthae pulēgii aqua, ℥ i to ℥ iv; aromatic.
Oleum volatile menthae pulegii, ♏ ij to ♏ v; carminative.
Spiritus menthae pulegii, ℥ ſs to ℥ i; carminative, stimulant.
Menthae virĭdis aqua, ℥ i to ℥ iv; aromatic.
Spiritus menthae viridis, ℥ ſs to ℥ i; carminative, stimulant.
Oleum volatile menthae viridis, ♏ ij to ♏ ij; carminative.
Infusum menthae viridis compositum, ℥ i to ℥ ij; carminative.
Mōri syrupus, ʒ i to ʒ ij; demulcent.
Moschus, g^r v to ℈ i; antispasmodic.
Tinctura moschi, ʒ i to ʒ ij; antispasmodic.
Mistura moschi, ℥ ſs to ℥ i; antispasmodic.
Myristĭcae moschatae spiritus, ℥ ſs to ℥ i; aromatic, stimulant.
Myroxyli peruiferi balsamum g^r x to ʒ ſs; stimulant.
Myrrha, g^r x to ʒ ſs; aromatic.
Tinctura myrrhae, ʒ i to ʒ ij; aromatic.

Myrtae pĭmentae aqua, ℥ i to ℥ iv; aromatic.
Oleum volatile myrti pimentae, ♏ iij to ♏ v; aromatic, pungent.
Spiritus myrti pimentae, ℥ ſs to ℥ i; aromatic, stimulant.
Nicotiānae tabăci folia, gr ſs to gr v; errhine.
Vinum nicotianae tabaci, ♏ xxx to ♏ l; diuretic.
Infusum nicotianae tabaci; emetic, anodyne.
Onisci aselli, ʒ i to ʒ ij; diuretic.
Opium, gr ſs to gr ij; anodyne.
purificatum, gr ſs to gr ij; anodyne.
Extractum opii, gr ſs to gr ij; anodyne.
Electuarium opiātum, ʒ ſs to ʒ i; anodyne, astringent.
Pilulae opiatae, gr x to ℈ i; anodyne.
Pulvis opiatus, gr x to ℈ i; antacid, anodyne.
Tinctura opīi, ♏ xx to ♏ xl; anodyne.
Tinctura opīi ammoniata, ʒ ſs to ʒ i; anodyne.
Tinctura opīi camphŏrāta, ʒ iv to ℥ ſs; anodyne.
Vinum opīi, ♏ xxx to ♏ lx; anodyne.
Origăni vulgāris oleum volătile, ♏ iij to ♏ v; carminative, caustic.
Ovum; alimentary.
Papāveris somniferi extractum, gr i to gr x; anodyne.
Syrupus papaveris somnifĕri, ʒ ſs to ʒ i; anodyne.
Papaveris rhoeădos syrupus, ʒ i to ʒ ij; demulcent.
Pimpĭnellae anīsi oleum volatile, ♏ iij to ♏ v; carminative.
Spiritus pimpĭnellae anisi, ℥ ſs to ℥ i; carminative, stimulant.
Pīni oleum volatile, ♏ x to ʒ ſs; and in taenia, ℥ i to ℥ iij; purgative, anodyne.
Pipĕris nigri pulvis, gr v to gr x; aromatic, pungent.
Pipĕris cubĕbae pulvis, ʒ ſs to ʒ i; aromatic.
Plumbi acetatis liquor; astringent.
Plumbi superacetas, gr ſs to gr ij; astringent.
Polygălae senĕgae decoctum, ℥ ſs to ℥ ij; expectorant.
Polygŏnum bistorta, ℈ i to ʒ i; astringent.
Potassae subcarbōnas, gr x to ʒ ſs; antacid.
Aqua sūpercarbonatis potassae, ℥ iv to ℥ viij; antacid.
Aqua subcarbonatis potassae, ʒ ſs to ʒ iſs; antacid.
Acetas potassae, ℈ i to ʒ i; diuretic, purgative.
Sulphas potassae, ʒ i to ℥ ſs; purgative.
Sulphas potassae cum sulphŭre, ʒ i to ℥ ſs; purgative.
Sūpersulphas potassae, ℈ i to ʒ ij; purgative.
Sulphurētum potassae, gr v to gr xv; antipsoric.
Aqua sulphurēti potassae, ♏ xx to ♏ l; antipsoric.
Tartras potassae, ʒ i to ℥ i; purgative.
Supertartras potassae, ʒ i to ℥ i; purgative.
Nitras potassae, gr x to ʒ ſs; diuretic.
Trochisci nitratis potassae, ʒ i to ʒ ij; diuretic.
Aqua potassae, ♏ x to ʒ ſs; lithontriptic.
supercarbonas, ♏ x to ʒ ſs; antacid.
Aqua alcălīna oxymuriătĭca, ʒ i to ℥ ſs; stimulant.
Punici granati fructus cortex, ℈ i to ʒ ſs; anthelmintic.

Pyri cydoniae decoctum, ℥ i to ℥ iv; demulcent.
Quassiae excelsae infusum, ℥ i to ℥ iv; Pulvis, g^r x to ʒ ſs; bitter.
Tinctura quassiae excelsae, ʒ i to ʒ ij; bitter, tonic.
Quassiae simaroubae infusum, ℥ i to ℥ iv; bitter, tonic.
Querci robŏris decoctum, ℥ i to ℥ ij; astringent.
Rhamni cathartĭci syrupus, ℥ ſs to ℥ i; cathartic.
Rhoei pulvis, g^r x to ℈ ij; cathartic.
Extractum rhoei, g^r x to ʒ ſs; cathartic.
Infusum rhoei, ℥ ij to ℥ iv; cathartic.
Pilulae rhoei compositae, g^r x to ʒ ſs; cathartic.
Tinctura rhoei, ʒ i to ʒ ij; tonic, ℥ i to ℥ ij; purgative.
Tinctura rhoei et aloës, ℥ ſs to ℥ i, cathartic.
Tinctura rhoei et gentianae, ℥ ſs to ℥ i; stomachic.
Tinctura rhoei composita, ℥ ſs to ℥ i; laxative.
Rhododendri chrysanthi folia, g^r v to g^r x; stimulant.
Rhois toxĭcŏdendri folia, gr ſs to g^r ij; narcotic.
Rĭcĭni commūnis oleum fixum, ℥ ſs to ℥ i; cathartic.
Rosae canīnae conserva, ʒ i to ℥ i; demulcent.
Rosae centifoliae aqua, ℥ i to ℥ ij; fragrant.
Syrupus rosae centĭfoliae, ʒ ij to ℥ ſs; demulcent.
Rosae Gallicae conserva, ʒ i to ℥ i; demulcent.
Infusum rosae Gallicae, ℥ i to ℥ viij; astringent.
Mel rosae Gallicae, ʒ i to ʒ ij; demulcent.
Syrupus rosae Gallicae, ʒ i to ʒ ij; demulcent.
Rosmarīni officinalis oleum volatile, ♏ iij to ♏ v; aromatic.
Spīritus rosmarini officinalis, ℥ ſs to ℥ i; aromatic, stimulant.
Rubiae tīnctorum radix, ℈ i to ʒ i; emmenagogue.
Rūtae graveŏlentis extractum, g^r x to ℈ i; emmenagogue.
Oleum essentiale rutae graveolentis, ♏ iij to ♏ v; emmenagogue.
Confectio rutae graveolentis, g^r x to ℈ i; emmenagogue.
Saccharum; demulcent.
Sagapēnum, gummi resina, g_r x to ʒ ſs; antispasmodic.
Salĭcis pulvis, g^r x to ʒ iſs; astringent.
Sambūci nigri succus spissatus, ℥ ſs to ℥ i; demulcent.
Scillae maritĭmae pulvis, g^r i to g^r iij; diuretic, expectorant.
Radix scillae recens, g^r v to g^r xv; expectorant.
Acētum scillae maritimae, ʒ ſs to ʒ iſs; expectorant, diuretic.
Oxymel scillae maritimae, ʒ ſs to ʒ iſs; diuretic.
Pilulae scilliticae, g^r x to ℈ i; diuretic, expectorant.
Syrūpus scĭllae marĭtimae, ʒ i to ʒ ij; expectorant, emetic.
Tinctūra scillae maritimae, ♏ x to ♏ xx; diuretic, expectorant.
Sinăpis albae semina integra, ℥ ſs to ℥ i; cathartic.
Pulvis sinapis albae, ʒ i to ʒ ij; emetic.
Smilācis sarsăparillae decoctum, ℥ iv to ℥ viii; demulcent.
Decoctum sarsăpărillae compositum, ℥ iv to ℥ viii; demulcent.
Extractum sarsaparillae, g^r x to ʒ i; demulcent.
Sodae carbōnas, g^r x to ʒ ſs; antacid.
Subcarbonas sodae, g^r x to ʒ ſs; antacid.
Subcarbonas sodae exsiccatum, g^r v to g^r xv; antacid, lithontriptic.
Tartras sodae, ʒ i to ℥ i; purgative.

Aqua supercarbonatis sodae, ℥ iv to ℥ viij; antacid.
Phosphas sodae, ℥ i to ℥ iſs; cathartic.
Sulphas sodae, ℥ i to ℥ iſs; cathartic.
Murias sodae, ℥ ſs *in glysters;* cathartic.
Subboras sodae, gr x to ʒ ſs.
Mel subboratis sodae, ʒ ſs to ʒ i; demulcent.
Solani dulcāmarae decoctum, ℥ i to ℥ ij; demulcent.
Spigēliae marīlandicae radix, ℈ ſs to ℈ i; anthelmintic.
Spongĭae ustae pulvis, ʒ i to ℥ i; deobstruent.
Stanni limatura, ℥ ſs to ℥ i; anthelmintic.
Styrācis benzoini tinctura composita, ʒ i to ʒ ij; expectorant.
Succini oleum, ♏ x to ♏ xx; antispasmodic.
Sulphur sublimatum, ʒ ſs to ʒ ij; cathartic.
Oleum sulphŭrātum, ♏ x to ♏ xxx; expectorant, irritating.
Terebinthinae, ℈ i to ʒ i; diuretic.
Toluīferae balsami tinctura, ʒ i to ʒ ij; expectorant.
Syrupus toluiferae balsami, ʒ i to ʒ ij; demulcent.
Tormentillae erectae radix, ℈ i to ℈ ij; astringent.
Valeriānae officinalis pulvis, ℈ i to ʒ i; antispasmodic.
Tinctura valerianae, ʒ to ʒ ij; antispasmodic.
Tinctura valerianae ammoniata, ʒ ſs to ʒ i; antispasmodic.
Extractum valerianae, gr x to ℈ i; antispasmodic.
Infusum valerianae, ℥ ſs to ℥ ij; antispasmodic.
Veratri albi decoctum; narcotic.
Vinum veratri albi, ʒ ſs to ʒ i; narcotic.
Tinctura veratri albi, ♏ v to ♏ x; narcotic.
Ulmi cortex, ℈ i to ʒ i; demulcent.
Decoctum ulmi, ℥ iv to ℥ viii; demulcent.
Viŏlae syrupus, ʒ i to ʒ ij; demulcent.
Zinci oxidum, gr iij to gr x; tonic.
Sulphas zinci, gr i to v; tonic; gr xv to ʒ ſs; emetic.

N. B.—These are in general the doses for adults from twenty to sixty, but they may be diminished for children and people past the prime of life, nearly in the following proportions:

Ages.		Proportionate doses.
Months	2	$\frac{1}{15}$
	7	$\frac{1}{12}$
	14	$\frac{1}{8}$
	28	$\frac{1}{5}$
Years	3	$\frac{1}{4}$
	5	$\frac{1}{3}$
	7	$\frac{1}{2}$
	14	$\frac{2}{3}$
	63	$\frac{11}{12}$
	77	$\frac{5}{6}$
	100	$\frac{4}{6}$

TABLE OF SYNONIMES *of the Medicines, simple and compound, in the Pharmacopœias of London, Dublin, and Edinburgh.*

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
ACACIAE ARABICAE GUMMI	Gummi Arabicum	Acaciae gummi	Mimosae niloticae gummi
Mucilago acaciae Arabicae	Mucilago	Mucilago acaciae	Mucago de gummi Arabico. *Par.*
Emulsio acaciae Arabicae	Emulsio Arabica		
Acaciae catechu extractum	Catechu	Catechu extractum	Terra Japonica; Mimosa catechu
Electuarium acaciæ catechu	Electuarium catechu comp.		Confectio Japonica
Tinctura acaciae catechu	Tinctura catechu	Tinctura catechu	Tinctura Japonica
Infusum acaciae catechu		Infusum catechu	Infusum Japonicum
Acetum	Acetum vini	Acetum	A. acetosum; A. aceticum imp.
Syrupus aceti			Syrupus acetosus
Acidum aceticum tenue	Acetum distillatum	Acidum aceticum dilutum	Acidum aceticum debilius. *P.*
Acidum aceticum forte	Acidum aceticum	Acidum aceticum fortius	Acidum radicale; Spiritus aceti
Acidum aceticum aromaticum			Acetum prophylacticum
Acidum aceticum camphoratum	Acidum aceticum camphoratum		
Acidum aceticum scilliticum	Acetum scillae	Acetum scillae	Aceticum scilliticum. *P.*
Acidum benzoicum	Acidum benzoicum	Acidum benzoicum	Flores benzoini, seu benzoes
Acidum citricum crystallizatum	Acidum citricum crystallis concretum	Acidum citricum	Acidum limonum
Acidum muriaticum	Acidum muriaticum	Acidum muriaticum	Acidum hydrochloricum. *P.*
	Acidum muriaticum dilutum		Spiritus salis communis acidus
Acidum oxymuriaticum	Aqua oxymuriatica		Chlorinum aqua solutum
Acidum nitricum		Acidum nitricum	
Acidum nitrosum	Acidum nitrosum		Spiritus nitri Glauberi, seu fumans
Acidum nitrosum dilutum	Acidum nitrosum dilutum	Acidum nitricum dilutum	Aqua fortis simplex
Unguentum acidi nitrosi	Unguentum acidi nitrosi		Unguent. nitric. seu oxygenatum. *P.*
Acidum succinicum	Acidum succinicum		Acidum succini. *P.*
Acidum sulphuricum	Acidum sulphuricum	Acidum sulphuricum	Oleum vitrioli
Acidum sulphuricum dilutum	Acidum sulphuricum dilutum	Acidum sulphuricum dilutum	Spiritus vitrioli tenuis
Acidum tartaricum		Acidum tartaricum	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Acipenser huso, &c.	Ichthyocolla		Colla piscium
Aconiti napelli folia	Aconitum	Aconiti folia	
Succus spissatus acon. nap.		Extractum aconiti	
Acori calami radix	Acorus	Calami radix	Acorus verus
Adeps ovillus	Sevum ovillum	Sevum	Sevum ex ove ariete. *P.*
		Sevum praeparatum	
Adeps suillus	Adeps suillus	Adeps	Axungia porcina
Adeps praeparatus	Adeps praeparatus	Adeps praeparata	
Aesculus hippocastanum	Aesculus hippocastanum, cortex		
Agrimonia eupatoria	Agrimonia		
Aether nitrosus	Aether nitrosus		
Spiritus aetheris nitrosi	Spiritus aethereus nitrosus	Spiritus aetheris nitrici	Spiritus nitri dulcis
Aether sulphuricus	Aether sulphuricus	Aether sulphuricus	
		Aether rectificatus	
		Oleum aethereum	
Aether sulphuricus cum alcohole	Liquor aethereus sulphuricus	Spiritus aetheris sulphurici	Spiritus vitrioli dulcis
	Liquor aethereus oleosus	Spiritus aeth. sulph. comp.	Liquor anodynus Hoffmanni
Alcohol	Alcohol	Alcohol	
Alcohol fortius	Spiritus vinosus rectificatus	Spiritus rectificatus	
Alcohol dilutum	Spiritus vinosus tenuior	Spiritus tenuior	
Allium cepa	Cepa		
Allii sativi radix	Allium sativum	Allii radix	
Allium porrum		Porri radix	
Aloes extractum			Ex variis aloes speciebus. *Ed.*
a Aloe hepatica	Aloe hepatica; gummi resina		Aloe sinuata? *Dub.*
b Aloe socotorina	Aloe socotorina; gummi resina	Aloes spicatae extractum	Aloe spicata. *Dub.*
		Extractum aloes purificatum	
	Pulvis aloes cum guaiaco	Pulvis aloes compositus	Pilulae eccophraticae
	Pulvis aloes cum canella		Hiera picra
Pilulae aloeticae	Pilulae aloes cum zingibere	Pilulae aloes compositae	
Pilulae aloes et assafoetidae			

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Pilulae aloes cum colocynthide	Pilulae colocynthidis compositae		Pilulae corciae
Pilulae aloes et myrrhae	Pilulae aloes cum myrrha	Pilulae aloes cum myrrha	Pilulae Rufi
		Decoctum aloes compositum	*Baume de vie*
Tinctura aloes socotorinae	Tinctura aloes	Tinctura aloes	Essentia aloes
Tinctura aloes aetherea			Elixir proprietatis vitriolicum
Tinctura aloes et myrrhae	Tinctura aloes composita	Tinctura aloes composita	Elixir proprietatis
Vinum aloes socotorinae	Vinum aloes	Vinum aloes	Tinctura sacra. Tinctura Hierae
Althaeae officinalis radix		Althaeae radix	Bismalva
Syrupus althaeae officinalis		Syrupus althaeae	Syrupus de althaea simplex. *P.*
Decoctum althaeae officinalis			
		Althaeae folia	
Alumen	Alumen : supersulph. argill. alcalis.	Alumen	Supersulphas aluminae et potassae
Alumen exsiccatum	Alumen ustum	Alumen exsiccatum	Alumen igne exsiccatum. *P.*
Pulvis aluminis compositus			Pulvis stypticus
		Liquor aluminis compositus	Aqua aluminosa Bateana
Ammoniae aqua			Spt. sal. amm. cum calce viva
Aqua ammoniae diluta	Aqua ammoniae causticae	Liquor ammoniae	
Oleum ammoniatum	Linimentum ammoniae	Linimentum ammoniae fortius	Linimentum volatile
Subcarbonas ammoniae	Carbonas ammoniae	Ammoniae subcarbonas	Sal cornu cervi
Solutio subcarb. ammon.	{ Aqua carbonatis ammoniae	Liquor ammoniae subcarbonatis	Spiritus salis ammoniaci
	{ Liquor volatilis cornu cervi		Spiritus cornu cervi
		Linimentum ammon. subcarbon.	Linimentum volatile mitius
Alcohol ammoniatum	Spiritus ammoniae	Spiritus ammoniae	Spiritus salis ammon. dulcis
Alcohol ammon. aromat.	Spiritus ammoniae aromaticus	Spiritus ammoniae aromaticus	Spiritus volatilis oleosus
Alcohol ammon. foetidum	Spiritus ammoniae foetidus	Spiritus ammoniae foetidus	Spiritus volatilis foetidus
		Spiritus ammoniae succinatus	*Eau de luce*
Aqua acetatis ammoniae	Aqua acetatis ammoniae	Liquor ammoniae acetatis	Spiritus Mindereri
Murias ammoniae	Sal ammoniacum ; Murias ammoniae	Ammoniae murias	Hydrochloras ammoniae. *P.*
	Aqua sulphureti ammoniae		
Hydrosulphuretum ammoniae	Hydrosulphuretum ammoniae		Liquor fumans Boylii
Ammoniacum gummi resina	Ammoniacum	Ammoniacum	Heracleum gummiferum. *Lond.*

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
	Lac ammoniaci	Mistura ammoniaci	Potio incisiva. *P.*
Emplastrum ammoniaci		Emplastrum ammoniaci	
	Emplastrum ammoniaci cum hydrar.	Emplas. ammoniaci cum hydrargyro	Emp. ex ammoniaco cum mercurio
Amomi repentis semina	Cardamomum minus	Cardamomi semina	Amomum cardamomum. *Dub.* Matonia cardamomum. *Lond.*
Tinctura amomi repentis	Tinctura cardamomi minoris	Tinctura cardamomi	
	Tinctura cardamomi minoris comp.	Tinctura cardamomi composita	Tinctura stomachica ; *Usquebach.*
Amomi zingiberis radix	Zingiber	Zingiberis radix	Zingiber officinale. *Lond.*
Tinctura amomi zingiberis	Tinctura zingiberis	Tinctura zingiberis	
Syrupus amomi zingiberis	Syrupus zingiberis	Syrupus zingiberis	
Amomum zedoaria	Zedoaria		
Amygdalae communis nuclei	Amygdalae dulces	Amygdalae dulces	
		Amygdalae amarae	
Oleum amygdalae communis	Oleum amygdalarum	Oleum amygdalarum	Oleum amygdalar. dulcium
		Confectio amygdalarum	
Emulsio amygdalae communis	Lac amygdalae	Mistura amygdalarum	Emulsio communis
Amylum	Amylum	Amylum	Ex tritico hyberno
Mucilago amyli	Mucilago amyli	Mucilago amyli	
Trochisci gummosi			Trochisci becchici albi
Amyridis Gileadensis resina			Balsamum Gileadense
Amyridis elemiferae resina	Elemi	Elemi	
	Unguentum elemi	Unguentum elemi compositum	Balsamum Arcaei
Anchusae tinctoriae radix	Anchusa		
Anethi foeniculi semina	Foeniculum dulce	Foeniculi semina	
	Oleum essentiale foeniculi dulcis		
	Aqua foeniculi dulcis	Aqua foeniculi	
Anethum graveolens		Anethi semina	
		Aqua anethi	Aqua seminum anethi
Angelicae archangelicae radix			Angelica sativa
Anthemidis nobilis flores	Chamaemelum	Anthemidis flores	
Extractum anthemidis nobilis	Extractum chamaemeli	Extractum anthemidis	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Oleum anthemidis nobilis		Oleum anthemidis	Oleum chamaemelum
Infusum anthemidis nobilis		Infusum anthemidis	
Decoctum anthemidis nobilis	Decoctum chamaemelum compositum	Decoctum malvae compositum	Decoctum commune pro clystere
	Enema catharticum		
Anthemidis pyrethri radix	Pyrethrum	Pyrethri radix	
Antimonii sulphuretum	Sulphuretum antimonii	Antimonii sulphuretum	Stibium. *P.*
Sulph. antimonii praeparatum	Sulphuretum antimonii praeparatum		Pulv. de sulphuret. antim.
Sulph. antimonii praecipitatum	Sulphur antimoniatum fuscum	Antim. sulphuretum praecipitatum	Sulph. aurat. antim. Kermes miner.
Sulph. antim. cum phosphate calcis	Pulvis antimonialis	Pulvis antimonialis	Pulvis Jacobi
	Oxydum antimonii nitromuriaticum	Antimonii vitrum	Pulvis Algarothi
Tartras antimonii	Tartarum antimoniatum	Antimonium tartarizatum	Tartarus emeticus
Vinum tartratis antimonii		Vinum antimonii tartarizati	Vinum antimoniale
Aqua distillata	Aqua distillata	Aqua distillata	
Arbutus uvae ursi folia	Uva ursi	Uvae ursi folia	
Arctii lappae radix	Bardana		Lappa major
Arctii lappae semina			
Argentum	Argentum	Argentum	
Nitras argenti	Nitras argenti	Argenti nitras	Causticum lunare. Lapis infernalis
Aristolochiae serpentariae radix	Serpentaria virginiana	Serpentariae radix	
Tinctura aristolochiae serpentariae	Tinctura serpentariae virginianae	Tinctura serpentariae	
Arnicae montanae flores	Arnica		Doronicum Germanicum
Radix arnicae montanae			
Aromaticum electuarium	Electuarium aromaticum	Confectio aromatica	Confectio cardiaca, sive Raleighana
	Emplastrum aromaticum		Emplastrum cephalicum
Aromaticus pulvis	Pulvis aromaticus	Pulvis cinnamomi compositus	Species aromaticae
Arsenici oxidum	Oxydum arsenici album	Arsenicum album	Acidum arseniosum
		Arsenicum album sublimatum	
	Arsenias kali		
Solutio arsenicalis		Liquor arsenicalis	Solutio mineralis Fowleri
Artemisia abrotanum	Abrotanum		

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Artemisiae absinthiae folia et summitates florentes	Absinthium vulgare	Absinthium	
	Extractum absinthii vulgaris		
Artemisia maritima	Absinthium maritimum		
Artemisiae santonicae cacumina	Santonicum		Semen cinae, seu contra
Arum maculatum	Arum		Aron
Assari Europaei folia	Asarum	Asari folia	
Asari pulvis compositus	Pulvis asari compositus		Pulvis sternutatorius, *seu* cephalicus
Astragalae tragacanthae gummi	Tragacantha	Tragacantha	Astragalus verus. *Lond.*
Mucilago astragalae tragacanthae	Mucilago tragacanthae		Mucago de gum. tragac. *P.*
		Pulvis tragacanthae compositus	Species diatragacanthae frigidae
Aspidii filicis maris radix	Filix mas	Filicis radix	Polypodium filix mas
Atropae belladonnae folia	Belladonna	Belladonnae folia	Solanum lethale
Succus spissatus atropae belladonnæ		Extractum belladonnae	
Avenae sativae semina		Avenae semina	
Farina avenae sativae			
Barytae carbonas			Barytes. Terra ponderosa
Murias barytae			Chloruretum barii. *P.*
Solutio muriatis barytae			Solutio muriatis barytici. *P.*
Sulphas barytae			Terra pond. vitriol. Spathum pond.
Bismuthum		Bismuthum	
		Bismuthi subnitras	Magisterium bismuthi
Bitumen petroleum	Petroleum Barbadense	Petroleum	Oleum petrae
Boletus igniarius			Agaricus chirurgorum
Bonplandiae trifoliatae cortex	Angustura	Cuspariae cortex	
Tinctura bonplandiae trifoliatae	Tinctura angusturae		
		Infusum cuspariae	
Bubonis galbani gummi resina	Galbanum	Galbani gummi resina	
	Tinctura galbani		
		Pilulae galbani compositae	Pilulae gummosae
Emplastrum gummosum	Emplastrum galbani	Emplastrum galbani compositum	Emplastrum commune cum gummi

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Calx	Calx recens usta	Calx	Calx viva
		Calx e testis	
Aqua calcis	Aqua calcis	Liquor calcis	Aqua calcis simplex. Solutio calcis
Linimentum calcis	Linimentum calcis		Linim. oleos. calcar. *P. Carron oil.*
Calcis carbonas			
a. mollior; Creta alba	Creta	Creta	Carbonas calcis friabilis
b. durior; Marmor album		Marmor album	Carbonas calcis dura
c. ex cancro paguro;	Chelae cancrorum		Pulv. e concrementis
d. ex cancro ostacho; Lapilli canc.	Calculi cancrorum		
e. ex testis ostrearum;		Testae	Oculi cancrorum
	Ostrearum testae praeparatae	Testae praeparatae	
Calcis carbonas praeparatus	Creta praeparata	Creta praeparata	
	Creta praecipitata		
Potio carbonatis calcis	Mistura cretae	Mistura cretae	Julepum e creta. Potio cretacea
Trochisci carbonatis calcis			Tabellae cardialgicae
Pulvis carbonatis calcis compositus		Pulvis cretae compositus	Pulvis e bolo comp. Pulv. cretaceus
		Calcis murias	Chloruretum calcii
Solutio muriatis calcis	Aqua muriatis calcis	Liquor calcis muriatis	
Camphora	Camphora	Camphora	Ex lauro camphora
Tinctura camphorae	Spiritus camphoratus	Spiritus camphorae	Spiritus vinosus camphoratus
Emulsio camphorae	Mistura camphorata	Mistura camphorae	Julepum e camphora
Oleum camphoratum	Oleum camphoratum	Linimentum camphorae	
		Linimentum camphoratum comp.	Bals. opodeldoch sine sapone
Canellae albae cortex	Canella alba	Canellae cortex	Costus corticosus
Cantharis vesicatoria	Cantharis	Cantharis	Lytta vesicatoria. Meloe vesicat.
Tinctura cantharidis vesicatoriae	Tinctura cantharidis	Tinctura cantharidis	
Unguent. pulveris canthar. vesicat.	Unguentum cantharidis	Ceratum cantharidis	Unguentum epispast. fortius
Unguentum infusi canthar. vesicat.		Unguentum cantharidis	Unguentum epispast. mitius
Emplastrum cantharidis vesicat.	Emplastrum cantharidis	Emplastrum cantharidis	Emplastrum vesicatorium
Emplastrum canth. vesicat. comp.			
Capsici annui fructus	Capsicum	Capsici baccae	Piper Indicum

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
		Tinctura capsici	
Carbo ligni	Carbo ligni	Carbo ligni	
Cardamines pratensis flores	Cardamine	Cardamines flores	
Cari carui semina	Caruon	Carui semina	Carvi
Spiritus cari carui	Spiritus carui	Spiritus carui	Aqua carvi spirituosa
	Oleum essentiale carui	Oleum carui	
		Aqua carui	
Cassiae fistulae fructus	Cassia fistularis	Cassiae pulpa	Pulpa cassiae
Electuarium cassiae fistulae	Electuarium cassiae	Confectio cassiae	Electuarium e cassia
Cassiae sennae folia	Senna	Sennae folia	
Tinctura sennae composita	Tinctura sennae	Tinctura sennae	Elixir salutis
Electuarium cassiae sennae	Electuarium sennae	Confectio sennae	Electuarium lenitivum
Syrupus cassiae sennae	Syrupus sennae	Syrupus sennae	
Infusum sennae compositum	Infusum sennae	Infusum sennae compositum	Infusum sennae commune
		Pulvis sennae compositus	Pulvis diasenae
Castor fiber; Castoreum	Castoreum Rossicum	Castoreum	
Tinctura castorei	Tinctura castorei Rossici	Tinctura castorei	
Tinctura castorei composita			
	Castoreum Canadense		
	Tinctura castorei Canadensis		
Centaureae benedictae herba	Carduus benedictus		Acanthus Germanicus
Cera alba	Cera alba	Cera alba	Apis mellifica
Linimentum simplex			
Unguentum simplex	Unguentum cerae albae		Unguentum album
Cera flava	Cera flava	Cera flava	
	Cera flava purificata		
Ceratum simplex	Unguentum cerae flavae	Ceratum simplex	
Emplastrum simplex		Emplastrum cerae	Emplastrum attrahens
Cerevisiae fermentum		Cerevisiae fermentum	
		Cataplasma fermenti	
Chironiae centaurii summitates	Centaureum minus	Centaurii cacumina	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Cinchonae lancifoliae cortex	Cinchona ; Cortex Peruvianus	Cinchonae lancifoliae cortex	Cortex Peruvianus pallidus
Cinchonae cordifoliae cortex		Cinchonae cordifoliae cortex	Cortex Peruvianus flavus
Cinchonae oblongifoliae cortex		Cinchonae oblongifoliae cortex	Cortex Peruvianus ruber
Decoctum cinchonae lancifoliae	Decoctum corticis cinchonae	Decoctum cinchonae	
	Extractum cinchonae molle	Extractum cinchonae molle	
	Extractum cinchonae durum	Extractum cinchonae durum	
Extractum cinchonae lancifoliae	Extractum cinchonae rubrae resinos.	Extractum cinchonae resinosum	
Infusum cinchonae lancifoliae	Infusum cinchonae sine calore	Infusum cinchonae	
Tinctura cinchonae lancifoliae	Tinctura cinchonae	Tinctura cinchonae	
Tinctura cinchonae composita	Tinctura cinchonae composita	Tinctura cinchonae composita	*Huxham's Tincture of Bark*
		Tinctura cinchonae ammoniata	
Citri aurantii succus	Aurantium Hispalense	Aurantii baccae	Mala aurantia
Cortex citri aurantii		Aurantii cortex	Flavedo aurantii
Aqua citri aurantii			
		Infusum aurantii compositum	
Conserva citri aurantii	Conserva aurantii	Confectio aurantiorum	Conserva flavedinis cort. aur.
	Tinctura aurantii	Tinctura aurantii	Tinctura corticis aurantii
Syrupus citri aurantii	Syrupus aurantii	Syrupus aurantiorum	Syrupus e corticibus aurantiorum
Citri medicae fructus	Limonum	Limones	Succus de fructibus citri medicae
Oleum volatile citri medicae		Limonum oleum	
Cortex citri medicae		Limonum cortex	
Aqua citri medicae			
Syrupus citri medicae	Syrupus limonum	Syrupus limonum	Syrupus e succo citrorum
Cocus cacti	Coccinella	Coccus	
Cochleariae armoraciae radix	Raphanus rusticanus	Armoraciae radix	
	Spiritus raphani compositus	Spiritus armoraciae compositus	Aqua raphani composita
		Infusum armoraciae compositum	
Coci butyraceae oleum fixum			Oleum palmae
Colchici autumnalis radix	Colchicum	Colchici radix	
Syrupus colchici autumnalis			
	Oxymel colchici	Acetum colchici	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
		Spiritus colchici ammoniatus	
		Vinum colchici	
Colombae radix	Colombo	Calumba	Cocculus palmatus
Infusum colombae		Infusum calumbae	
Tinctura colombae	Tinctura colombo	Tinctura calumbae	
Conii maculati folia	Cicuta	Conii folia	Cicuta major. *P.*
		Conii semina	
Succus spissatus conii maculati	Succus spissatus cicutae	Extractum conii	
Tinctura conii maculati			
Convolvuli scammoniae gummi resina	Scammonium	Scammoniae gummi resina	Diagrydium
Pulvis scammoniae compositus		Pulvis scammoniae compositus	Pulvis comitis Warwicensis
	Electuarium scammonii	Confectio scammoneae	Electuarium caryocostinum
Convolvuli jalapae radix	Jalapa	Jalapae radix	Mechaocanna nigra
Extractum convolvuli jalapae	Extractum jalapae	Extractum jalapae	Extractum jalapii
	Extractum jalapae resinosum		
Tinctura convolvuli jalapae	Tinctura jalapae	Tinctura jalapae	Tinctura jalapii
Pulvis jalapae compositus			
Copaiferae officinalis resina	Balsamum copaibae	Copaiba	Balsamum Brasiliense
Coriandri sativi semina	Coriandrum	Coriandri semina	
Cornu cervae elaphi	Cornu cervinum	Cornua	
	Pulvis cornu cervini usti	Cornu ustum	Phosphas calcis
	Decoctum cornu cervini	Mistura cornu usti	Decoctum album
	Liquor volatilis cornu cervini		Spiritus cornu cervi foetidum
	Oleum cornu cervini		Oleum cornu cervi
	Oleum rectificatum cornu cervini		Oleum e cornibus
Croci sativi stigmata	Crocus	Croci stigmata	Crocus Anglicus
Tinctura croci	Tinctura croci	Syrupus croci	
Crotonis eleutheriae cortex	Cascarilla	Carcarillae cortex	Croton cascarilla. *Dub. Lond.* Clutia eleutheria. *Linn.*

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Tinctura crotonis eleutheriae	Tinctura	Tinctura cascarillae	
	Extractum cascarillae resinosum		
		Infusum cascarillae	
Croton tiglium		Tiglii oleum	
Cucumeris colocynthidis pulpa	Colocynthis	Colocynthidis pulpa	
		Extractum colocynthidis	
	Extractum colocynthidis comp.	Extractum colocynthidis comp.	Extractum catharticum. Pil. rudii
Pilulae colocynthidis compositae	Pilulae colocynthidis compositae		
Cuminum cyminum		Cumini semina	
		Emplastrum cumini	Emplastrum e cymine
Cuprum	Cuprum		Aes
Subacetas cupri	Ærugo, subacetas cupri	Ærugo	Viride aeris
	Ærugo praeparata		
	Oxymel aeruginis	Linimentum aeruginis	Mel Egyptiacum
Unguentum subacetatis cupri	Unguentum aeruginis		
Ammoniaretum cupri	Cuprum ammoniatum	Cuprum ammoniatum	Cuprum ammoniacum
Pilulae ammoniareti cupri			
	Aqua cupri ammoniati	Liquor cupri ammoniati	Aqua saphirina
Sulphas cupri	Sulphas cupri	Cupri sulphas	Cuprum vitriol. Vitr. coeruleum
Solutio sulphatis cupri composita			Aqua styptica
Daphnes mezerei cortex	Mezereum	Mezerei cortex	Laureola; Cocognidium
Decoctum daphnes mezerei			
Daturae stramoniae herba	Stramonium	Stramonii folia	
		Extractum stramonii	
		Stramonii semina	
Dauci carotae radix		Dauci radix	Carota. Rad. dauci
	Dauci sylvestris semina	Dauci semina	
Delphinii staphisagriae semina	Staphisagria	Staphisagriae semina	
Dianthi caryophylli flores	Caryophyllum rubrum		Caryophylla rubra
Syrupus dianthi caryophylli	Syrupus caryophyllum		
Digitalis purpureae folia	Digitalis	Digitalis folia	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
		Digitalis semina	
	Decoctum digitalis		
Tinctura digitalis purpureae	Tinctura digitalis	Tinctura digitalis	
Infusum digitalis purpureae		Infusum digitalis	
Dolichi prurientis pubes	Dolichos	Dolichi pubes	
Dorsteniae contrajervae radix		Contrajervae radix	
		Pulvis contrajervae comp.	Lapis contrayervae
Eryngium maritimum	Eryngium		
Eugeniae caryophyllatae flores	Caryophylli aromaticae	Caryophylli	
Oleum volatile eugeniae caryophyl.	Oleum essentiale caryoph. aromat.	Caryophyllorum oleum	
		Infusum caryophyllorum	
Euphorbii officinalis gummi resina		Euphorbiae gummi resina	
		Farina	Triticum hybernum
Ferri fila	Ferrum	Ferrum	Chalybs
Limatura ferri			
Limatura ferri purificata			Ferrum alcoholisatum
Oxidum ferri nigrum			Squamae ferri
Oxidum ferri nigrum purificatum	Oxydum ferri nigrum		Squamae ferri purificatae
Carbonas ferri praecipitatus	Carbonas ferri	Ferri subcarbonas	
Subcarbonas ferri praeparatus	Rubigo		Chalybis rubigo praeparata
Sulphas ferri	Sulphas ferri	Ferri sulphas	Sal martis. Vitriol. viride. Sal chalyb.
Sulphas ferri exsiccatus	Sulphas ferri exsiccatum		Vitroleum calcinatum
Pilulae sulphatis ferri comp.			
		Mistura ferri composita	*Griffith's myrrh mixture*
		Pilulae ferri compositae	
Oxidum ferri rubrum	Oxydum ferri rubrum		Colcothar vitrioli
Emplastrum oxidi ferri rubri	Emplastrum thuris		Emplastrum roborans
Tinctura muriatis ferri	Tinctura muriatis ferri	Tinctura ferri muriatis	Tinctura martis in spiritu salis
	Tinctura muriatis cum oxydo rubro		Tinctura martis aurea
Murias ammoniae et ferri	Murias ammoniae et ferri	Ferrum ammoniatum	Flores martiales. Ens veneris
		Tinctura ferri ammoniati	Tinctura martis Mynsichti

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Tartras potassae et ferri	Tartarum ferri	Ferrum tartarizatum	Mars solubilis. Tartarus martialis
	Vinum ferri	Vinum ferri	Vinum chalybeatum. Vin. martis
	Acetas ferri		Extractum martis
	Tinctura acetatis ferri		
	Tinctura acetatis ferri cum alcohol		
Sulphuretum ferri	Sulphuretum ferri		
		Liquor ferri alkalini	Tinctura martis alkalina
Ferulae assae foetidae gummi resina	Assa foetida	Assafoetidae gummi resina	
	Lac assae foetidae	Mistura assafoetidae	
Tinctura ferulae assae foetidae	Tinctura assae foetidae	Tinctura assafoetidae	Tinctura foetida
	Enema foetidum		
Pilulae ferulae assae foetidae comp.	Pilulae myrrhae compositae	Pil. Galbani comp.	Pilulae gummosae
Emplastrum ferulae assae foetidae			Emplastrum antihystericum
Ficus caricae fructus	Carica	Caricae fructus	
Fucus vesiculosus	Quercus marina	Fucu s	
	Querci marinae pulvis		Æthiops vegetabilis
Gallae	Gallae	Gallae	Cynipidum quercus-folii nidi
Tinctura gallarum	Tinctura gallarum		
Gambogiae gummi resina	Gambogia	Cambogia	{ Stalagmitis cambogioides, *L. D.*
Pilulae gambogiae compositae		Pilulae cambogiae compositae	{ Gummi guttae
Gentianae luteae radix	Gentiana	Gentianae radix	Gentiana rubra
Extractum gentianae	Extractum gentianae	Extractum gentianae	
Infusum gentianae compositum	Infusum gentianae compositum	Infusum gentianae compositum	Infusum amarum simplex
Tinctura gentianae composita	Tinctura gentianae composita	Tinctura gentianae composita	Tinctura amara, Elixir stomachicum
Vinum gentianae compositum			Vinum amarum
Geoffraeae inermis cortex	Geoffroea		Geoffroya inermis. *Dub.*
Decoctum geoffraeae inermis			
Geum urbanum	Geum urbanum		Caryophyllata
Glycyrrhizae glabrae radix	Glycyrrhiza	Glycyrrhizae radix	Radix liquiritiae
Extractum glycyrrhizae glabrae	Extractum glycyrrhizae	Extractum glycyrrhizae	Succus liquiritiae depuratus
Trochisci glycyrrhizae glabrae			Trochisci becchici nigri

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Trochisci glycyr. glabrae cum opio			Trochisci anodyni
Gratiolae officinalis herba	Gratiola		
Guaiaci officinalis lignum	Guaiacum	Guaiaci lignum	Lignum sanctum
Resina guaiaci officinalis		Guaiaci resina	
Tinctura guaiaci officinalis	Tinctura guaiaci	Tinctura guaiaci	Elixir guaiacinum
Tinctura guaiaci officinalis ammon.	Tinctura guaiaci ammoniata	Tinctura guaiaci ammoniata	Elixir guaiacinum volatile
Decoctum guaiaci compositum	Aqua calcis composita		Decoctum lignorum
		Mistura guaiaci	Lac guaiaci
Haematoxyli campechiani lignum	Haematoxylum	Haematoxyli lignum	Lignum Campechense
Extractum haematoxyli campech.	Extractum haematoxyli campechiani	Extractum haematoxyli	Extractum ligni Campechensis
Hellebori nigri radix	Helleborus niger; Melampodium	Hellebori nigri radix	Melampodium
Extractum helleboris nigri	Extractum helleboris nigri		Extractum melampodii
Tinctura helleboris nigri	Tinctura hellebori nigri	Tinctura hellebori nigri	Tinctura melampodii
Helleborus foetidus	Helleboraster	Hellebori foetidi folia	
Hirudo medicinalis	Hirudo medicinalis		
Hordei distichi semina	Hordeum distichum	Hordei semina	
Decoctum hordei	Decoctum hordei	Decoctum hordei	Aqua hordeata
	Decoctum hordei compositum	Decoctum hordei compositum	Decoctum pectorale
Humuli lupuli strobili		Humuli strobili	
		Extractum humuli	Extractum lupuli
Tinctura humuli lupuli		Tinctura humuli	
Hydrargyrus	Hydrargyrum	Hydrargyrum	Argentum vivum; Mercurius
Hydrargyrus purificatus	Hydrargyrum purificatum	Hydrargyrum purificatum	
Pilulae hydrargyri	Pilulae hydrargyri	Pilulae hydrargyri	Pilulae coeruleae
Emplastrum hydrargyri		Emplastrum hydrargyri	Emp. lithargyri cum hydrargyro
Unguentum hydrargyri	Unguentum hydrargyri	Unguentum hydrargyri fortius	Unguentum coeruleum fortius
	Unguentum hydrargyri mitius	Unguentum hydrargyri mitius	Unguentum coeruleum mitius
		Linimentum hydrargyri	
	Hydrargyrum cum magnesia		
	Hydrargyrum cum creta	Hydrargyrum cum creta	Mercurius alkalisatus
Acetas hydrargyri	Acetas hydrargyri		

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Murias hydrargyri corrosivus	Murias hydrargyri corrosivum	Hydrargyri oxymurias	Mercurius corrosivus sublimatus
		Liquor hydrargyri oxymuriatis	Liquor Bellostii. Aqua Swietenii
Submurias hydrargyri mitis	Submurias hydrargyri sublimatum	Hydrargyri submurias	Calomelas. Panacea merc.
Pilulae submuriatis hydrar. comp.		Pilulae hydrargyri submuriatis comp.	Pilulae Plummeri
Submurias hydrargyri praecipitatus	Submurias hydrargyri praecipitatum		Hydrargyrus praecipitatus dulcis
	Submurias hydrargyri ammoniatum	Hydrargyrum praecipitatum album	Mercurius cosmeticus
	Submuriatis hydrargyri unguentum	Unguent. hydrargyri praecipitati albi	Unguentum e mercurio praecip.
Oxidum hydrargyri cinereum	Pulvis hydrargyri cinereus	Hydrargyri oxidum cinereum	Mercurius solubilis
Unguentum oxidi hydrarg. ciner.			
	Oxydum hydrargyri	Hydrargyri oxidum rubrum	Mercurius calcinatus
Oxidum hyd. rub. per acid. nitric.	Oxydum hydrargyri nitricum	Hydrargyri nitrico-oxydum	Mercurius praecipitatus ruber
Unguentum oxidi hydrargyri rubri	Unguentum subnitratis hydrargyri	Unguentum hydrargyri nitrico-oxydi	
Unguent. nitratis hydrarg. fortius	Unguentum supernitratis hydrargyri	Unguentum hydrargyri nitratis	Unguentum citrinum
Unguentum nitratis hydrar. mitius			
Subsulphas hydrargyri flavus	Oxydum hydrargyri sulphuricum		Turpethum miner. Merc. emet. flav.
Sulphuretum hydrargyri nigrum	Sulphuretum hydrargyri nigrum	Hydrargyri sulphuretum nigrum	Æthiops mineralis; Pulv. hypnoticus
Hydrargyri sulphuretum rubrum	Sulphuretum hydrargyri rubrum	Hydrargyri sulphuretum rubrum	Cinnabaris factitia
Hyosciami nigri herba	Hyosciamus	Hyoscyami folia	
Semina hyosciami nigri		Hyosciami semina	
Succus spissatus hyosciami nigri	Succus spissatus hyosciami	Extractum hyosciami	
Tinctura hyosciami nigri	Tinctura hyosciami	Tinctura hyosciami	
Hyssopus officinalis herba	Hyssopus		
Inula helenium	Enula campana	Helenium	
Ipecacuanha; radix	Ipecacuanha	Ipecacuanhae radix	Calicocca *or* Cephaelis ipecacuanha
Pulvis ipecacuanhae et opii	Ipecacuanhae pulvis compositus	Pulvis ipecacuanhae compositus	Pulvis Doveri
Vinum ipecacuanhae	Vinum ipecacuanhae	Vinum ipecacuanhae	
Iridis Florentinae radix			Orris
Juniperi communis bacca	Juniperus	Juniperi baccae	
		Juniperi cacumina	
Spiritus juniperi compositus	Spiritus compositus juniperi	Spiritus juniperi compositus	Aqua juniperi composita
Oleum volatile juniperi commun.	Oleum essentiale juniperi	Oleum juniperi	

EDINBURGH.	DUBLIN	LONDON.	VARIOUS.
Juniperi lyciae gummi resina	Olibanum	Olibanum	Thus
Juniperi sabinae folia	Sabina	Sabinae folia	
Oleum volatile juniperi sabinae	Oleum essentiale sabinae		
	Extractum sabinae		
Ceratum juniperi sabinae	Unguentum sabinae	Ceratum sabinae	
Kino ; succus concretus	Kino	Kino	Eucalyptus resinifera, *Ed.*
Tinctura kino	Tinctura kino	Tinctura kino	Butea frondosa, *Dub.*
		Pulvis kino compositus	Pterocarpus erinacea. *L.*
Krameria triandria		Krameriae radix	
Lactucae virosae herba			Lactuca sylvestris
Succus spissatus lactucae virosae			
Lactucae sativae herba		Lactuca sativa	
Succus spissatus lactucae sativae		Extractum lactucae	Succus concretus lactucae sativae
Lactucarium			
Lavandulae spicae flores	Lavandula	Lavandulae flores	
Spiritus lavandulae spicae	Spiritus lavandulae	Spiritus lavandulae	Spiritus lavand. simp.
Spiritus lavandulae compositus	Spiritus lavandulae compositus	Spiritus lavandulae compositus	
Oleum volatile lavandulae spicae	Oleum essentiale lavandulae spicae	Oleum lavandulae	Oleum spicae
Lauri cassiae cortex	Cassia lignea		Xylocassia. Can. Malab.
Flores lauri cassiae			
Aqua lauri cassiae			
Lauri cinnamomi cortex	Cinnamomum	Cinnamomi cortex	Canella
Aqua lauri cinnamomi	Aqua cinnamomi	Aqua cinnamomi	Aqua cinnamomi simplex
		Cinnamomi oleum	
Spiritus lauri cinnamomi	Spiritus cinnamomi	Spiritus cinnamomi	Aqua cinnamomi spirituosa
Tinctura lauri cinnamomi	Tinctura cinnamomi	Tinctura cinnamomi	
Tinctura cinnamomi comp.	Tinctura cinnamomi composita	Tinctura cinnamomi composita	Tinctura aromatica
Lauri nobilis bacca		Lauri baccae	
		Lauri folia	
Oleum expressum lauri nobilis			

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Lauri sassafras lignum	Sassafras	Sassafras lignum	
Radix lauri sassafras		Sassafras radix	
Oleum volatile lauri sassafras	Oleum essentiale sassafras		
Leontodi taraxaci radix	Taraxacum	Taraxaci radix	Dens leonis
Herba leontodi taraxaci			
	Extractum taraxaci	Extractum taraxaci	
Lichen Islandicus	Lichen Islandicus	Lichen	Muscus Islandicus
Decoctum lichenis Islandici	Decoctum lichenis Islandici	Decoctum lichenis	
Lichen rocella	Litmus		Lacmus tinctorius
Lini usitatissimi semina	Linum	Lini usitatissimi semina	
Oleum lini usitatissimi	Oleum lini	Oleum lini	Ol. seminum lini
Infusum lini usitatissimi		Infusum lini compositum	
Linum catharticum	Linum catharticum	Linum catharticum	
Lythrum salicaria	Lythrum salicaria		
Magnesia	Magnesia usta	Magnesia	
Magnesiae carbonas	Magnesia	Magnesiae subcarbonas	
Sulphas magnesiae	Sulphas magnesiae	Magnesiae sulphas	Sal catharticum amarum
Malvae silvestris herba		Malva	
Flores malvae silvestris			
Manganesium	Manganesium		Magnesia vitrariorum
Manna	Manna	Manna	Succus concretus fraxini orni
Mel	Mel	Mel	
Mel despumatum	Mel despumatum	Mel despumatum	
Oxymel	Oxymel	Oxymel simplex	
Marrubii vulgaris herba	Marrubium album	Marrubium	
Melaleucae leucadendri oleum volat.	Oleum cajeput	Cajuputi oleum	Melaleuca cajuputi. *Lond.*
Melissae officinalis folia			
Menispermi cocculi baccae			
Menthae piperitae herba	Mentha piperitis	Mentha piperita	
Aqua menthae piperitae	Aqua menthae piperitidis	Aqua menthae piperitae	Aqua menth. pip. simplex
Spiritus menthae piperitae		Spiritus menthae piperitae	Aqua menth. pip. spirituosa

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Oleum volatile menthae piperitae	Oleum essentiale menthae piperitidis	Oleum menthae piperitae	
Menthae pulegii herba	Pulegium	Pulegium	
Aqua menthae pulegii	Aqua pulegii	Aqua pulegii	
	Oleum essentiale pulegii	Oleum pulegii	
		Spiritus pulegii	
Mentha viridis	Mentha sativa	Mentha viridis	
	Oleum essentiale menthae sativae	Oleum menthae viridis	
	Aqua menthae sativae	Aqua menthae viridis	Aqua menthae vulgaris simplex
	Spiritus menthae viridis		Aqua menthae vulgaris spirituosa
	Infusum menthae compositum		
Menyanthis trifoliatae folia	Trifolium paludosum	Menyanthes	Trifolium palustre
Momordica elaterium	Cucumis agrestis	Elaterii pepones	Ecbalium elaterium
Momordicae elaterii succus spissatus	Elaterium	Extractum elaterii	
Morus nigra		Mori baccae	
		Syrupus mori	
Moschus	Moschus	Moschus	Ex moscho moschifero
	Tinctura moschi		
		Mistura moschi	Julepum e moscho
Myristicae moschatae nucleus	Nux moschata	Myristicae nuclei	Myristicae mosch. involucrum nuclei
Spiritus myristicae moschatae	Nucis moschatae spiritus	Spiritus myristicae	Aqua nucis moschatae spirituosa
Macis			Arillus fructus
Myroxyli Peruiferi balsamum	Balsamum Peruvianum	Balsamum Peruvianum	Balsamum Indicum nigrum
Myrrhae gummi resina	Myrrha	Myrrha	
Tinctura myrrhae	Tinctura myrrhae	Tinctura myrrhae	
Myrti pimentae fructus	Pimento ; Piper Jamaicense	Pimentae baccae	Piper Jamaicense
Aqua myrti pimentae	Aqua pimenti	Aqua pimentae	Aqua pimentae simplex
Spiritus myrti pimentae	Spiritus pimenti	Spiritus pimentae	Aqua pimentae spirituosa
Oleum volatile myrti pimentae	Oleum essentiale pimenti	Oleum pimentae	
Nicotianae tabaci folia	Nicotiana	Tabaci folia	
Vinum nicotianae tabaci			
		Infusum tabaci	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Oleae Europaeae oleum fixum	Oleum olivarum	Olivae oleum	
Oniscus asellus	Millepedae		
Opium	Opium	Opium molle	Meconium
		Opium durum	
	Opium purificatum molle	Extractum opii	
	Opium purificatum durum		
Pulvis opiatus.		Pulvis cretae comp. cum opio	
		Pulvis cornu cervi cum opio	
Pilula opiata	Pilulae e styrace	Pilulae saponis cum opio	Pilulae thebaicae
Electuarium opiatum		Confectio opii	Philonium Londinense
Emplastrum opii		Emplastrum opii	
Tinctura opii	Tinctura opii	Tinctura opii	Tinctura thebaica. Laudan. liquidum
Tinctura opii ammoniata			Elixir paregoricum. *Ed.*
Tinctura opii camphorata	Tinctura opii camphorata	Tinctura camphorae composita	Elixir paragor. Anglorum. *L. Dub.*
Tinctura saponis et opii			Linimentum anodynum
	Syrupus opii		Syrupus diacodii
Vinum opii		Vinum opii	Laudanum liquidum Sydenhami
Origani majoranae herba	Majorana		
Oleum origani majoranae	Oleum essentiale origani	Oleum origani	
Origanum vulgare	Origanum	Origanum	
Ovum		Ovum	Phasianus Gallus
Oxalis acetosella		Acetosella	Lujula
Papaveris somniferi capsulae	Papaver album	Papaveris capsulae	
Extractum papaveris somniferi		Extractum papavèris	Meconium
Syrupus papaveris somniferi	Syrupus papaveris albi	Syrupus papaveris	Syrupus diacodion; Syr. e meconio
		Decoctum papaveris	D. pro fomento. Fotus communis
Papaver rhoeas	Papaver erraticum	Rhoeados petalla	
	Syrupus papaveris erratici	Syrupus rhoeados	
Pastinacae opoponacis gummi resina		Opoponacis gummi resina	
Pimpinellae anisi semina	Anisum	Anisi semina	
Oleum volatile pimpinellae anisi	Oleum essentiale anisi	Oleum anisi	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
	Spiritus anisi compositus	Spiritus anisi	
Pini balsameae resina	Balsamum Canadense	Terebinthina Canadensis	
Terebinthina veneta	Terebinthina veneta		ex pino larice
Terebinthina vulgaris	Terebinthina vulgaris	Terebinthina vulgaris	ex pino sylvestre
		Linimentum terebinthinae	
Oleum volatile pini	Oleum terebinthinae	Terebinthinae oleum	ex variis pinis
Oleum pini purissimum	Oleum terebinthinae rectificatum	Oleum terebinthinae rectificatum	Oleum terebinthinae aethereum
		Abietis resina	Thus ; Resina concreta
Pix Burgundica	Pix Burgundica	Pix abietina	Pix arida
		Emplastrum picis compositum	Emplastrum picis Burgundicae
Resina alba	Resina flava : Resina alba	Resina flava	Colophonium ; Resina praeparata
Unguentum resinosum	Unguentum resinae albae	Ceratum resinae	Unguentum basilicum flavum
Emplastrum resinosum	Emplastrum lithargyri cum resina	Emplastrum resinae	Emplastrum adhaesivum
Pix liquida	Pix liquida	Pix liquida	*Tar.* Resina empyreumatica
Unguentum picis	Ungentum picis liquidae	Unguentum picis liquidae	
		Pix nigra	*Pitch*
		Unguentum picis nigrae	
Piper cubeba		Cubeba	
Piperis longi fructus	Piper longum	Piperis longi fructus	
Piperis nigri fructus	Piper nigrum	Piperis nigri baccae	
	Unguentum piperis nigri	Confectio piperis nigri	
Pistacia terebinthus		Terebinthina Chia	
Pistaciae lentisci resina		Mastiche	
Plumbi acetas	Acetas plumbi	Acetas plumbi	Saccharum saturni
Unguentum acetatis plumbi	Unguentum acetatis plumbi	Ceratum plumbi acetatis	Unguentum saturninum
	Liquor subacetatis lithargyri	Liquor plumbi subacetatis	Extractum saturni
		Liquor plumbi subacetatis dilutus	
		Ceratum plumbi compositum	
	Liquor subacet. plumbi comp.		
Carbonas plumbi	Cerussa ; subacetas plumbi	Plumbi subcarbonas	Pulv. de subcarbon. plumbi

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Unguentum carbonatis plumbi	Unguentum cerussae		Unguentum album
Oxidum plumbi semivitreum	Lithargyrum	Plumbi oxydum semivitreum	Pulv. de oxido plumbi
Emplastrum oxid. plumb. semivit.	Emplastrum lithargyri	Emplastrum plumbi	Diachylon simplex
Oxidum plumbi rubrum			Plumbum ustum rubrum
Polygalae senegae radix	Seneka	Senegae radix	
Decoctum polygalae senegae		Decoctum senegae	
Polygoni bistortae radix	Bistorta	Bistortae radix	
Potassa	Kali causticum	Potassa fusa	Lapis causticus
Potassa cum calce	Kali causticum cum calce	Potassa cum calce	Causticum commune mitius
Aqua potassae	Aqua kali caustici	Liquor potassae	Lixivium saponarium causticum
Acetas potassae	Acetas kali	Potassae acetas	Sal diureticus
Carbonas potassae		Potassae carbonas	
Subcarbonas potassae	Subcarbonas kali	Potassae subcarbonas	Sal absinthii
Subcarbonas potassae purissimus	Subcarbonas kali e tartaro	Potassae subcarbonas ex tartaro	Sal tartari
Subcarbonas potassae impurus	Cineres clavellati ; Kali impurum	Potassae impurae	Alkali fixum vegetabile
	Aqua subcarbonatis kali	Liquor potassae subcarbonatis	Oleum tartari per deliquium
Aqua super-carbonatis potassae			
Nitras potassae	Nitrum ; nitras kali	Potassae nitras	Nitrum prismaticum
Trochisci nitratis potasssae			
Sulphas potassae	Sulphas kali	Potassae sulphas	Sal de duobus. Arcanum duplicatum
Sulphas potassae cum sulphure			Sal polychrestus Glauberi
		Potassae supersulphas	
Sulphuretum potassae	Sulphuretum kali	Potassae sulphuretum	Hepar sulphuris
	Aqua sulphureti kali		
Supertartras potassae	Crystalli tartari	Potassae supertartras	Tartarus purificatus
Supertartras potassae impurus	Tartarum	Tartarum	Tartarus crudus
Tartras potassae	Tartaras kali	Potassae tartras	Tartarum solubi
	Aqua alkalina oxymuriatica		Solutio chloratis potassae
Pruni domesticae fructus	Prunus Gallica	Pruna	Drupae siccatae
Pterocarpi santalini lignum	Santalum rubrum	Pterocarpi lignum	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Punicae granati fructus cortex	Granatum	Granati cortex	
Pyrus cydonia		Cydoniae semina	Succus de fructibus cydoniae
		Decoctum cydoniae	Mucilago cydoniorum
Quassiae excelsae lignum	Quassia	Quassiae lignum	Picrania amara
Tinctura quassiae excelsae	Tinctura quassiae		
Infusum quassiae excelsae		Infusum quassiae	
Quassiae simarubae cortex	Simarouba	Simaroubae cortex	Simaruba amara
		Infusum simaroubae	
Quercus roboris cortex	Quercus	Cortex quercus	Quercus pedunculata. *Lond.*
Decoctum quercus roboris		Decoctum quercus	
	Extractum quercus		
Rhamni cathartici succus	Rhamnus catharticus	Rhamni baccae	Baccarum rhamni succus
Syrupus rhamni cathartici		Syrupus rhamni	Syrupus domesticus
Rhei radix	Rheum	Rhei radix	Rhabarbarum
Tinctura rhei		Tinctura rhei	Tinctura rhabarbari spirituosa
	Tinctura rhei	Tinctura rhei composita	
Tinctura rhei et aloes			Elixir sacrum
Tinctura rhei et gentianae			Tinctura rhoei amara
Infusum rhei		Infusum rhei	
Vinum rhei			Tinctura rhabarbari vinosa
Pilulae rhei compositae			Pilulae stomachicae
		Extractum rhoei	Extractum rhei aquosum
Rheum undulatum	Rheum undulatum		
Rhododendri chrysanthi folia			
Rhois toxicodendri folia		Toxicondendri folia	Toxicodendron
Ricinus communis semina	Ricinus	Ricini semina	Palma christi. Cataputia major
Oleum fixum ricini communis		Ricini oleum	Oleum expressum seminum ricini
Rosae caninae fructus		Rosae caninae pulpae	Cynosbatus
Conserva rosae caninae		Confectio rosae caninae	Conserva fructus cynosbati
Rosae centifoliae petala	Rosa damascena	Rosae centifoliae petala	Rosa pallida
Aqua rosae centifoliae	Aqua rosae damascenae	Aqua rosae	

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Syrupus rosa centifoliae		Syrupus rosae rubrae	Syrupus rosarum solutivus
Rosae Gallicae petala	Rosa rubra	Rosae Galicae petala	
Mel rosae gallicae	Mel rosae rubrae	Mel rosae	Mel rosaceum
Conserva rosae gallicae	Conserva rosae rubrae	Confectio rosae Gallicae	
Infusum rosae gallicae	Infusum rosae rubrae	Infusum rosae compositum	Tinctura rosarum
Syrupus rosae gallicae			
Rosmarinus officinalis cacumina	Rosmarinus	Rosmarini cacumina	
Spiritus rosmarini officinalis	Spiritus rosmarini	Spiritus rosmarini	
Oleum volatile rosmarini officinalis	Oleum essentiale rosmarini	Oleum rosmarini	
Rubiae tinctorum radix	Rubia	Rubiae radix	
Rumex aquaticus	Rumex aquaticus		Britannica ; Hydolopathum
Rumicis acetosae folia		Acetosae folia	
Rutae graveolentis herba	Ruta	Rutae folia	
Extractum rutae graveolentis	Extractum rutae		
	Oleum essentiale rutae		Oleum rutae aethereum
		Confectio rutae	Electuarium e baccis lauri
Saccharum non purificatum	Saccharum	Saccharum	
Saccharum purificatum		Saccharum purificatum	
Syrupus simplex	Syrupus simplex	Syrupus simplex	Syrupus communis
Syrupus empyreumaticus			*Molasses ; Treacle*
Sagapenum ; gummi resina	Sagapenum	Sagapenum	Serapinum
Salix alba	Salix		
Salix fragilis	Salix fragilis		
Salix caprea		Salicis cortex	
Salviae officinalis folia	Salvia		Herba salviae minoris
Sambuci nigrae flores	Sambucus	Sambuci flores	
Baccae sambuci nigrae			
Cortex sambuci nigrae			
	Unguentum sambuci	Sambuci unguentum	
Succus spissatus sambuci nigrae	Succus spissatus sambuci		Rob baccarum sambuci
Sapo durus	Sapo durus Hispanicus	Sapo durus	Sapo ex olivae oleo et soda confectus

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
		Ceratum saponis	
Tinctura saponis camphorata	Linimentum saponis	Linimentum saponis compositum	Balsamum saponaceum
Emplastrum saponaceum	Emplastrum saponis	Emplastrum saponis	Emplastrum e sapone
Sapo mollis		Sapo mollis	Sapo ex oleo et potassa confectus
Scillae maritimae radix	Scilla	Scillae radix	Squilla
Radix scillae maritimae exsiccata	Pulvis scillae		Scilla praeparata
Acetum scillae	Acetum scillae	Acetum scillae	Acetum scilliticum
Syrupus scillae	Oxymel scillae	Oxymel scillae	Oxymel scilliticum
Tinctura scillae	Tinctura scillae	Tinctura scillae	Essentia squillae
Pilulae scilliticae	Pilulae scillae cum zingibere	Pilulae scillae compositae	
Scrophularia nodosa	Scrophularia		
Sium nodiflorum	Sium		
Sinapis albae semina	Sinapi	Sinapis semina	Sinapis nigra
	Cataplasma sinapeos	Cataplasma sinapis	Sinapismus
Smilacis sarsaparillae radix	Sarsaparilla	Sarsaparillae radix	
Decoctum smilacis sarsaparillae	Decoctum sarsaparillae	Decoctum sarsaparillae	
		Syrupus sarsaparillae	
	Decoctum sarsaparillae compositum	Decoctum sarsaparillae compositum	
		Extractum sarsaparillae	
Sodae subcarbonas impurus	Barilla, soda impura	Soda impura	Natron impurum
Subcarbonas sodae	Carbonas sodae	Sodae subcarbonas	Sal sodae. Alcali minerale aëratum
	Carbonas sodae siccatum	Sodae subcarbonas exsiccata	
Carbonas sodae		Sodae carbonas	
Aqua supercarbonatis sodae			
Phosphas sodae	Phosphas sodae		
Sulphas sodae	Sulphas sodae	Sodae sulphas	Sal catharticus glauberi
Murias sodae	Sal commune; murias sodae	Sodae murias	Chloruretum sodii. *P.*
	Murias sodae siccatum		
Sub-boras sodae	Borax, sub-boras sodae	Sodae sub-boras	Biboras sodae. Thomson
Mel sub-boratis sodae		Mel boracis	
Potassae et sodae tartras	Tartaras sodae et kali	Soda tartarizata	Sal rupellensis. Sal Seignette

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Solani dulcamarae radix	Dulcamara	Dulcamarae caulis	Solanum scandens
		Decoctum dulcamarae	
Solidago virga aurea	Virga aurea		
Spartii scoparii summitates	Genista	Spartii cacumina	
	Extractum genistae		
Spermaceti	Spermaceti	Cetaceum	Physeter macrocephalus
Spigeliae Marilandicae radix	Spigelia	Spigeliae radix	
	Unguentum spermatis ceti	Unguentum cetacei	Linimentum album
Ceratum simplex		Ceratum cetacei	Ceratum album
Spongia officinalis	Spongia	Spongia	
	Pulvis spongiae ustae	Spongia usta	Pulv. de spongiis ustis
Stanni limatura	Stannum	Stannum	
Pulvis stanni	Pulvis stanni		
Styracis benzoini balsamum	Benzoe	Benzoinum	Assa dulcis
Tinctura benzoini composita	Tinctura benzoini composita	Tinctura benzoini composita	Balsamum traumaticum
Styracis officinalis balsamum	Styrax calamita	Styracis balsamum	
	Styrax purificata		
Succinum	Succinum	Succinum	Electrum, Carabe
Oleum succini	Oleum succini	Oleum succini	
Oleum succini purissimum	Succini oleum rectificatum		
Sulphur		Sulphur	
Sulphur sublimatum	Sulphur sublimatum	Sulphur sublimatum	Flores sulphuris
Sulphur sublimatum lotum	Sulphur sublimatum lotum	Sulphur lotum	
		Sulphur praecipitatum	
Unguentum sulphuris	Unguentum sulphuris	Unguentum sulphuris	Unguentum antipsoricum
		Unguentum sulphuris compositum	
Oleum sulphuratum		Oleum sulphuratum	Balsamum sulphuris
Swietenia febrifuga ; cortex	Swietenia febrifuga		
Tamarindi Indicae fructus	Tamarindus	Tamarindi pulpa	
Tanaceti vulgaris folia	Tanacetum		
Flores tanaceti vulgaris			

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Teucrium chamaedrys	Chamaedrys		
Teucrium marum	Marum Syriacum		
Toluiferae balsami balsamum	Balsamum Tolutanum	Balsamum Tolutanum	Balsamum de Carthagena
Tinctura toluiferae balsami	Tinctura balsami Tolutani		
Syrupus toluiferae balsami		Syrupus Tolutanus	Syrupus balsamicus
Tormentillae erectae radix	Tormentilla	Tormentillae radix	Tormentilla officinalis. *Lond.*
Tussilaginis farfarae folia	Tussilago	Tussilago	
Flores tussilaginis farfarae			
Valerianae officinalis radix	Valeriana	Valerianae radix	
	Tinctura valerianae	Tinctura valerianae	
Tinctura valerianae ammoniata	Tinctura valerianae ammoniata	Tinctura valerianae ammoniata	Tinctura valerianae volat.
	Extractum valerianae		
	Infusum valerianae		
Veratri albi radix	Helleborus albus	Veratri radix	
		Decoctum veratri	
		Vinum veratri	
	Unguentum hellebori albi	Unguentum veratri	
Tinctura veratri albi			
Veronica beccabunga	Beccabunga		
Vinum album Hispanum			
Violae odoratae flores	Viola		Viola martialis
Syrupus violae odoratae	Syrupus violae		
Vitis viniferae fructus	Uvae passae sole siccatae	Uvae passae	
Ulmi campestris cortex	Ulmus	Ulmi cortex	
	Decoctum ulmi	Decoctum ulmi	
Winterae aromaticae cortex			Winteranus cortex
Zincum	Zincum	Zincum	
Carbonas zinci impurus	Calaminaris	Calamina	Cadmia fossilis
Carbonas zinci impurus praepar.	Lapis calaminaris praeparatus	Calamina praeparata	
Ceratum carbonas zinci impuri	Unguentum calaminaris	Ceratum calaminae	Ceratum epuloticum
Oxidum zinci	Oxydum zinci	Zinci oxydum	Flores zinci

EDINBURGH.	DUBLIN.	LONDON.	VARIOUS.
Unguentum oxidi zinci	Unguentum oxidi zinci	Unguentum zinci	
Oxidum zinci impurum	Tutia		
Oxidum zinci impurum præparatum			
Unguentum oxidi zinci impuri	Unguentum tutiae		
Solutio acetatis zinci	Tinctura acetatis zinci		
Sulphas zinci	Sulphas zinci	Zinci sulphas	Sal vitrioli ; Calcanthum album
Solutio sulphatis zinci			Aqua vitriolica

NOTE.—The articles in Italics in the first column are the scientific names of articles not in the Edinburgh Pharmacopoeia.

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